

West Valley Nuclear Services Company, Inc.

P.O. Box 191 - 10282 Rock Springs Road
West Valley, New York 14171-0191
(716) 942-3235



Mr. Conrad Simon, Director
Air and Waste Management Division
United States Environmental Protection Agency - Region II
26 Federal Plaza
New York, New York 10278

WV-AA4
WR:96:0057
May 16, 1996

ATTENTION: Paul A. Giardina

Dear Mr. Simon:

SUBJECT: Notification of Vitrification Facility Slurry Fed Ceramic Melter

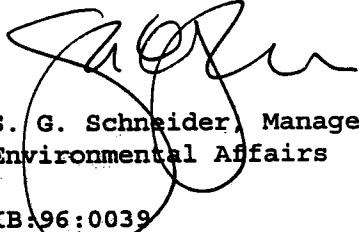
REFERENCES: 1) Letter 1005:95:09, C. Simon to T. J. Rowland, "Interim Approval of Air Permit Applications for Radionuclide Release from Vitrification Operations," dated May 8, 1995

Pursuant to the above referenced letter and 40 CFR 61.09 (a)(1), the West Valley Demonstration Project (WVDP) will begin operations of the Slurry Fed Ceramic Melter on June 29, 1996 by transferring High Level Waste (HLW) to the Concentration Feed Make-up Tank. Therefore, there is a potential for emissions of radionuclides. A letter of verification of startup of this source will be provided within fifteen days of the actual startup date.

If you have any questions regarding this matter, please contact Elizabeth A. Matthews, U. S. Department of Energy, at (716) 942-4930 or me at (716) 942-2065.

Very truly yours,

WEST VALLEY NUCLEAR SERVICES CO., INC.


S. G. Schneider, Manager
Environmental Affairs

IB:96:0039

SGS:LCS:bnm

cc: G. Brozowski, USEPA
E. A. Matthews, DOE-WV, WV-37
M. N. Maloney, DOE-WV, WV-37
P. Merges, NYSDEC-Albany

EPR/BNM0857.LCS



Recd.
Rec. Mgmt.
May 17, 1995

Department of Energy

Ohio Field Office
West Valley Area Office
P.O. Box 191
West Valley, NY 14171

DW:95:0504

May 17, 1995

Mr. W. G. Poulson, President
West Valley Nuclear Services Co., Inc.
P.O. Box 191
West Valley, NY 14171

ATTENTION: S. G. Schneider, Environmental Affairs Manager, MS Z23

SUBJECT: Interim Approval of Air Permit Applications for Radionuclide Release from Vitrification Operations

REFERENCE: Letter 1005:95:09, C. Simon to T. J. Rowland, "Interim Approval of Air Permit Applications for Radionuclide Release from Vitrification Operations," dated May 8, 1995

Dear Sir:

The referenced letter is enclosed for your files. It provides interim approval of our permit applications for the Vitrification Facility, submitted pursuant to the National Emission Standards for Hazardous Air Pollutants. Please note the following requirements:

- Notification to the U.S. Environmental Protection Agency (EPA) of initial startup, between 30 and 60 days prior to startup
- Notification to EPA of actual startup, within 15 days of startup
- Re-evaluation of dose calculations using actual monitoring data and submission to EPA within six months of startup (submit to the DOE West Valley Area Office [DOE-WV] within four months of startup, for review)

Please enter these dates in the Open Items Tracking System. Allow at least one week for DOE-WV review of the notification letters. Elizabeth Matthews may be reached on Extension 4930 if you have questions.

Sincerely,

B. A. Mazurowski, Deputy Director
West Valley Area Office

RECORDS MGMT

Enclosure: Referenced Letter

cc: R. B. Provencher, DOE-WV, w/enc.
R. E. Lawrence, WVNS, MS 51, w/enc.

EAM:055:95 - 1005:95:09

EAM/cch

MAY 17 AH 9:47

RECEIVED

DISTRIBUTION LIST:

DW:95:0504

EPN letter

J. R. Alexander	MS-Z18	T. F. Kocialska	MS-M
S. R. Barnard	MS-53	D. H. Kurasch	MS-AA7
S. M. Barnes	MS-M	<u>R. E. Lawrence</u>	<u>MS-51 *</u>
D. L. Bonenberger	MS-52	J. A. Lazzaro	MS-B1E
M. B. Boone	MS-B1A	<u>J. L. Little</u>	<u>MS-07 *</u>
P. M. Bourgeois	MS-49	S. A. MacVean	MS-201
G. F. Centrich	MS-41B	J. L. Mahoney	MS-301
A. K. Chaddha	MS-42	S. P. McKenzie	MS-D
J. D. Chamberlain	MS-A	D. C. Meess	MS-B1F
W. R. Chiquelin	MS-K	H. W. Morse	MS-39
P. S. Church	MS-PSO	R. A. Palmer	MS-M
M. L. Ciaramella	MS-WHS	J. Paul	MS-57
B. J. Connors	MS-56	P. S. Peacock	MS-AA5
R. E. Craig	MS-38	D. K. Ploetz	MS-59
T. C. Crisler	MS-C	W. J. Potts	MS-Z26
M. E. Crotzer	MS-AA24	W. G. Poulsom	MS-07
D. W. Crouthamel	MS-AA15	D. H. Pritchard	MS-B1C
W. J. Czyz	MS-N	C. L. Repp	MS-AA9
F. W. Damerow	MS-51	V. Riggi	MS-Z01
F. L. Davis	MS-AA24	J. A. Sage	MS-39
V. A. Descamp	MS-51	<u>L. C. Salvatori</u>	<u>MS-AA9 *</u>
K. M. Fenton-Beach	MS-B1J	D. J. Sawyer	MS-55
J. M. Ference	MS-Z25	C. M. Schiffhauer	MS-52
R. J. Fussner	MS-57	<u>S. G. Schneider</u>	<u>MS-Z23 *</u>
D. H. Garland	MS-Z25	D. L. Shugars	MS-B1N
J. R. Gerber	MS-AA21	G. E. Spencer	MS-C
M. C. Gervacio	MS-AA13	M. K. Suchak	MS-I
J. M. Gramling	MS-AA9	P. A. Szalinski	MS-B
D. J. Harward	MS-AA24	S. J. Szalinski	MS-AA9
S. B. Haughey	MS-04	P. J. Valenti	MS-I
R. D. Hughes	MS-B1J	R. E. Vandervort	MS-MNT
J. P. Hummel	MS-AA19	J. J. Volpe	MS-41A
R. A. Humphrey	MS-42	W. T. Watters	MS-TSB
J. F. Jablonski	MS-TSB	P. C. Weddle	MS-B1A
J. P. Jackson	MS-Z23	T. G. Weiss	MS-Z16
K. R. Karlson	MS-207	L. J. Whiting	MS-B1A
P. L. Keel	MS-B1A	P. G. Winger	MS-B1G
R. B. Keel	MS-M	C. J. Winkler	MS-Z04
S. K. Khanna	MS-42	M. Wright	MS-207
P. S. Klanian	MS-R	<u>Operations Planning</u>	<u>MS-Z01 *</u>

* with enclosure

West Valley Nuclear Services Company, Inc.



4.5
P.O. Box 191 - 10282 Rock Springs Road
West Valley, New York 14171-0191
(716) 942-3235

Department : Environmental Affairs
Ext/MS : 2065/AA4
Memo # : IB:97:0081
Date : March 20, 1997
Subject : Approval of Slurry Fed Ceramic Melter and Vitrification Facility Heating, Ventilating, and Air Conditioning (HVAC) System Applications Pursuant to 40 CFR Part 61, Subpart H "National Emission Standards for Radionuclide Emissions from DOE Facilities"

To : G. F. Centrich WV-B1A
R. J. Fussner WV-M
J. F. Jablonski WV-205
J. P. Jackson WV-AA4
S. A. MacVean WV-201
E. D. Savage WV-B1D
A. K. Shukla WV-AA4
J. A. Siener WV-AA4
M. K. Suchak WV-I
P. J. Valenti WV-I
C. J. Winkler WV-K

cc : IB Letter Log WV-AA4
RC file 4.3 WV-AA4
MRC (original) WV-50B

Attached is the EPA notification stating EPA's final approval of the NESHAP permit application for the Melter and Vitrification HVAC system. EPA's review found the normal operation of the source will not cause emissions in violation of the standard of 10 mrem/yr, established by paragraph 61.92 of 40 CFR 61 Subpart H, "National Emission Standard's for Emission of Radionuclides Other Than Radon From Department of Energy Facilities."

WVDP was granted interim approval on May 17, 1995, pending startup of the melter and HVAC system and Re-evaluation of dose calculations using actual monitoring data. The last of this information was submitted in January of 1997. A NESHAP Permit does not have expiration date.

If you have any questions, please contact Laurie Kutina of my Staff at ext. 4682.

S. G. Schneider, Manager
Environmental Affairs

Attachment: Letter 0325:97:09, J. M. Fox to T. J. Rowland, "US Environmental Protection Agency's (EPA) Review of the Applications for the Slurry Feed Ceramic Melter and the Vitrification Facility HVAC System" dated February 18, 1997.

EOS/BNM1203.LSK



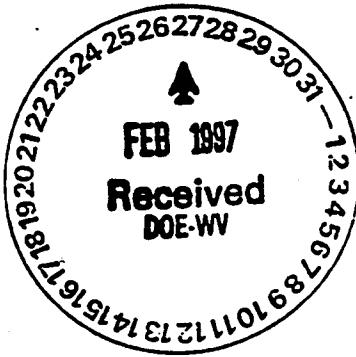
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

45136
4

FEB 18 1997

Mr. T.J. Rowland
Director, West Valley Project Office
U.S. Department of Energy
10282 Rock Springs Road
P.O. Box 191, MS-DOE
West Valley, New York 14171



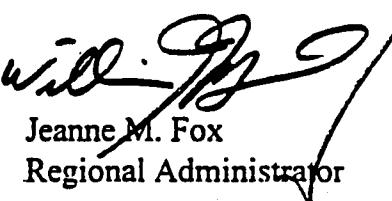
Dear Mr. Rowland:

In accordance with the provisions of the Clean Air Act, as amended (42 U.S.C. 7401 et seq.), the U.S. Environmental Protection Agency (EPA) has reviewed your applications for the Slurry Fed Ceramic Melter and the Vitrification Facility HVAC system.

Pursuant to Title 40, Code of Federal Regulations, Part 61, Subpart H, National Emission Standards for Radionuclide Emissions from Department of Energy Facilities, approval of your application is granted. This approval is granted based upon a technical review of submissions received by EPA on January 7, 1997 for the above location.

If you have any questions regarding this approval, please contact Paul A. Giardina, Radiation & Indoor Air Branch Chief, at (212) 637-4010.

Sincerely,


Jeanne M. Fox
Regional Administrator

cc: John P. Cahill, Acting Commissioner
New York State Department of
Environmental Conservation

Commissioner Barbara A. DeBuono
New York State Department of Health

4.3

West Valley Nuclear Services Company, Inc.

P.O. Box 191 - 10282 Rock Springs Road
West Valley, New York 14171-0191
(716) 942-3235

T.J. Rowland, Director
DOE West Valley Demonstration Project
P. O. Box 191
West Valley, New York 14171-0191

X-3
WV-AA4
WD:97:0010
January 6, 1997

ATTENTION: M. N. Maloney

Dear Mr. Rowland:

SUBJECT: Estimated Total Effective Dose Equivalent (TEDE) to the Maximally Exposed Off-Site Individual (MEOSI) Following the Start-up of Radioactive Vitrification Operations

- REFERENCES: 1) Letter 1005:95:09, C. Simon to T. J. Rowland, "Interim Approval of Air Permit Applications for Radionuclide Release from Vitrification Operations," dated May 8, 1995
- 2) Letter EAM:055:95 - 1005:95:09 (DW:95:0504), B. A. Mazurowski to W. G. Poulsen, "Interim Approval of Air Permit Applications for Radionuclide Release from Vitrification Operations," dated May 17, 1995

Pursuant to Reference 1 above, WVNS has recalculated the Total Effective Dose Equivalent (TEDE) to the maximally exposed off-site individual (MEOSI) following the start of radioactive vitrification operations at the West Valley Demonstration Project (WVDP). The original estimate, performed prior to the end of calendar year 1996, was a prediction of how the start of radioactive vitrification operations in June 1996 would impact the TEDE to the MEOSI for calendar years 1996 (corresponding to one-half year of radioactive vitrification operations) and 1997 (one full year of radioactive vitrification operations).

In order to estimate the TEDE prior to the end of the 1996 calendar year, the following assumptions were made:

- 1) The complete 1996 WVDP meteorological data were not yet available. The estimate was based on the 1995 WVDP meteorological data as input for the CAP88-PC dose assessment computer code.
- 2) The radionuclide air emissions for all atmospheric release points except the vitrification HVAC (Environmental Monitoring Program location "ANVITSK") and the main plant stack (EMP location "ANSTACK") were assumed to be the same as those for 1995.
 - a. For the estimate of the TEDE (in mrem/yr) associated with the 6 months of pre-vitrification operations in 1996, the release rate (in curies/year) of radionuclides from these stacks was assumed to be the average of that observed during the first and second quarter of 1996.
 - b. For the estimate of the TEDE associated with the 6 months of radioactive vitrification operations in 1996, the third quarter 1996 ANSTACK and ANVITSK radionuclide release rates were used to extrapolate an estimate of a full year's radioactive vitrification air effluent releases from these stacks.
- 3) Non-permitted point sources, which contributed only 0.003% of the TEDE to the MEOSI in 1995², were omitted from this estimate.

- 4) Communication with the off-site radiological vendor laboratory in December 1996 revealed that historical iodine-129 results for all air effluent samples analyzed from July 1995 through September 1996 should be considered unreliable. This is because the vendor laboratory used an inadequate procedure for these analyses. The vendor laboratory has since revised their procedure to include a weight/volume amount of leaching solution as opposed to a straight volume amount as previously identified (see Attachment F).

The WVDP's Environmental laboratory took direct gamma scan measurements prior to shipment of the third quarter air samples to the vendor laboratory. These direct measurements were requested by the U.S. Nuclear Regulatory Commission during a monitoring visit on June 19-23, 1995. The reason for the gamma scans was to reevaluate the relative nuclide mix released from the site as a result of the vitrification process and any impact on the DOE Environmental Guideline values established on preoperational nuclide mix data. As such, the WVDP agreed to evaluate the radionuclide mixture in air effluents following vitrification system start-up.

The direct gamma scan measurements taken by the WVDP indicated a discrepancy in the analytical data from the off-site vendor laboratory for the iodine-129 results. A further technical evaluation of this discrepancy by the WVDP and vendor lab determined that the error was due to an incorrect analytical procedure. The vendor lab's procedure did not specify the correct quantity of reagent to separate iodine-129 from the charcoal canisters.

The vendor laboratory has changed their procedure (revision date 12/6/96) for iodine-129 analysis to include the use of sufficient reagent for the chemical separation of iodine-129 from the WVDP charcoal canister samples. As such, the WVDP does not believe it is necessary to include an on-site gamma scan measurement within our QC procedures. The WVDP has also planned a surveillance of the lab to take place during the analysis of the fourth quarter air samples.

The WVDP feels confident that the results for all other nuclides analyzed by the vendor lab are reliable. This is based on several reasons. First, the vendor laboratory has met all WVNS laboratory qualification requirements. Second, the WVDP performs a gamma scan for cesium-137 as part of the criticality monitoring program. Those results correlate directly with the results received from the vendor lab. Lastly, as a part of the vendor laboratory's internal QC procedures, a tracer (serving as an internal standard) is used for most other analyses. The use of a tracer ensures the laboratory has successfully completed the analysis by recovering an acceptable level of the analyte.

Air effluent releases of iodine-129 have historically been one of the major contributors to the TEDE to the MEOSI. It is important, then, to recalculate an estimate of releases of iodine-129 to obtain the best estimate of the TEDE for this assessment. The following outlines the data reconstruction process:

- a. The average iodine-129 emission rate from ANSTACK for the period from the third quarter of 1995 through the second quarter of 1996 is estimated to be the average emission rate calculated for the 10 calendar quarters which preceded the third quarter of 1995 (i.e., January 1993 through June 1995).

- b. The third quarter 1996 iodine-129 emissions from ANSTACK were calculated using direct gamma measurement results obtained by the WVDP Environmental Laboratory (E-Lab). The results of these weekly analyses are valid results per 40 CFR Part 61, Appendix B, Method 114. These analyses were started during the first week of radioactive vitrification operations in response to a request from the NRC to identify changes in the air effluent radionuclide distribution attributable to the vitrification process.³ There was no impetus for the E-Lab to perform iodine-129 measurements for the main plant stack samples prior to the start of vitrification operations. The E-Lab has not performed weekly measurements for iodine-129 at any other stacks.
- c. The third quarter 1996 emissions of iodine-129 from ANVITSK are estimated to be 13 times the value reported by the vendor laboratory. This factor is the difference between the vendor laboratory's result for the third quarter 1996 ANSTACK composite sample and the E-Lab's direct gamma screening results. Since no E-Lab direct gamma screening information is available for the ANVITSK iodine-129 sample cartridges, the best assumption is that the vendor laboratory underestimated the ANVITSK results by the same proportion.

These assumptions allow the estimation of TEDE following the start-up of Vitrification operations in June 1996. However, it should be noted that other atmospheric release points will be included in the 1996 annual TEDE assessment that will be reported in the 1996 NESHAP annual report. This assessment, which will be completed per 40 CFR 61 Subpart H, "National Emission Standards for Emissions of Radionuclides Other Than Radon From Department of Energy Facilities," and which is scheduled to be performed in the spring of 1997, will include consideration of emissions from the container sorting and packaging facility (ANCSPFK) and the demonstration CO₂ decontamination facility (ANCO2DV).

Results of the Assessment

The estimated TEDE to the MEOSI for 1996 is 6.3×10^{-3} mrem/yr to an individual residing 1900 meters north-northwest of the main plant stack. The estimated TEDE to the MEOSI for 1997, which includes an entire year's vitrification operations, is 1.2×10^{-2} mrem/yr to the same individual residing 1900 meters north-northwest of the main plant stack. These values are less than 0.2% of the 10 mrem/yr standard specified in 40 CFR 61 Subpart H. The TEDE for the prior five years and the 1996 and 1997 estimates are shown in Table A.

Greater than 96% of the estimated TEDE for 1996 and 1997 is attributable to iodine-129 releases from both ANVITSK and ANSTACK. Most of the balance of the TEDE is attributable to cesium-137.

Table A. Annual TEDE from 1991 through 1995 and estimates of the TEDE for 1996 (one-half year of vitrification) and 1997 (full year of vitrification).

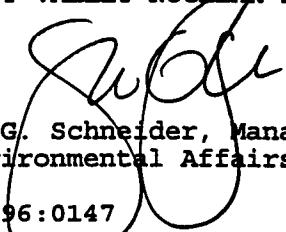
Calendar Year	TEDE ⁴ (mrem/yr)	Percent of Standard
1991	4.9×10^{-4}	0.0049 ‰
1992	1.1×10^{-4}	0.0011 ‰
1993	1.6×10^{-4}	0.0016 ‰
1994	3.2×10^{-4}	0.0032 ‰
1995	4.3×10^{-4}	0.0043 ‰
†1996	6.3×10^{-3}	0.062 ‰
†1997	1.2×10^{-2}	0.12 ‰

† Estimate

If you have any questions regarding any of the enclosed materials, please contact J. A. Siener at (716) 942-2103.

Very truly yours,

WEST VALLEY NUCLEAR SERVICES CO., INC.



S. G. Schneider, Manager
Environmental Affairs

IB:96:0147

SGS:JAS:bnm

- Attachments:
- A) CAP88-PC synopsis and summary output files for the permitted short stacks at the WVDP for pre-vitrification 1996.
 - B) CAP88-PC synopsis and summary output files for the permitted main plant stack at the WVDP for pre-vitrification 1996.
 - C) CAP88-PC synopsis and summary output files for the permitted short stacks at the WVDP after vitrification start-up.
 - D) CAP88-PC synopsis and summary output files for the permitted main plant stack at the WVDP after vitrification start-up.
 - E) Proposed Letter to EPA
 - F) Standard Operating Procedure for the Determination of Iodine-129, Revision 3

References

1. 1995 Effluent Information System/On-Site Discharge Information System Report.
2. 1995 NESHAP Annual Report for the WVDP.
3. Letter 1499:95:08, B. A. Mazurowski to W. G. Poulson, "U.S. Nuclear Regulatory Commission (NRC) Monitoring Visit on June 19 - 23, 1995," dated August 30, 1995.
4. Chapter 4 of Annual Site Environmental Reports, 1991 - 95.



FACSIMILE REQUEST AND COVER SHEET

**U.S. Environmental Protection Agency
Region II
26 Federal Plaza
New York, New York 10278**

TO: Elizabeth Matthews
OFFICE: DOE, West Valley Office
PHONE:
FAX: (716) 942-4703

*CC:
Joe May
Steve Kebola
Julie Forti
Duane Baum*

FROM: Jennifer Magruder
OFFICE: Division of Air and Waste Management, Radiation Branch
PHONE: (212) 637-4002
FAX: FTS - 264-7613 **Commercial:** (212) FTS - 264-7613

DATE: May 9, 1995
SUBJECT: Interim Approval

Number of Pages (including cover sheet): 3

Message: Hi Elizabeth - Finally, what you have been waiting for. If you have any questions, give me a call. Jennifer



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

45136
FEB 18 1997

Mr. T.J. Rowland
Director, West Valley Project Office
U.S. Department of Energy
10282 Rock Springs Road
P.O. Box 191, MS-DOE
West Valley, New York 14171



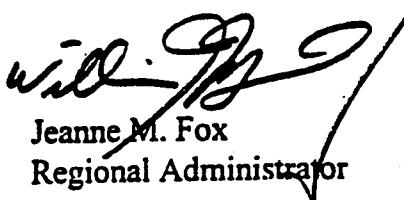
Dear Mr. Rowland:

In accordance with the provisions of the Clean Air Act, as amended (42 U.S.C. 7401 et seq.), the U.S. Environmental Protection Agency (EPA) has reviewed your applications for the Slurry Fed Ceramic Melter and the Vitrification Facility HVAC system.

Pursuant to Title 40, Code of Federal Regulations, Part 61, Subpart H, National Emission Standards for Radionuclide Emissions from Department of Energy Facilities, approval of your application is granted. This approval is granted based upon a technical review of submissions received by EPA on January 7, 1997 for the above location.

If you have any questions regarding this approval, please contact Paul A. Giardina, Radiation & Indoor Air Branch Chief, at (212) 637-4010.

Sincerely,


Jeanne M. Fox
Regional Administrator

cc: John P. Cahill, Acting Commissioner
New York State Department of
Environmental Conservation

Commissioner Barbara A. DeBuono
New York State Department of Health



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY - REGION II

290 BROADWAY

NEW YORK, NEW YORK 10007-1866

MAY - 8 1995

Mr. T.J. Rowland
Director, West Valley Project Office
U.S. Department of Energy
MS-DOE
10282 Rock Springs Road
P.O. Box 191
West Valley, New York 14171

Dear Mr. Rowland:

The purpose of this letter is to discuss West Valley Demonstration Project's (WVDP) radionuclide NESHAPs air permit applications for the Slurry Fed Ceramic Melter and the Vitrification Facility HVAC System. WVDP submitted the applications to construct/modify for the two above mentioned sources pursuant to the National Emission Standards for Hazardous Air Pollutants (NESHAPs) for radionuclides, 40 CFR 61.96.

The Environmental Protection Agency (EPA) has conducted an extensive review of these applications which included an evaluation related to the source background information, review and computer modeling of the information contained within the applications, site visits and visual inspections of the two sources, and discussions with pertinent WVDP employees. Based on our review, EPA is issuing WVDP an interim approval for the operation of the Slurry Fed Ceramic Melter and the Vitrification Facility HVAC System.

Final approval for the operation of these sources will be granted assuming the following conditions are met:

- Pursuant to 40 CFR 61.09 (1,2), WVDP must notify EPA of initial startup of these sources not more than 60 days and no less than 30 days before the startup date. Also, EPA must be notified of actual startup date within 15 days of the startup.
- Within six (6) months of the startup of these sources, WVDP must re-evaluate and re-calculate the Total Effective Dose Equivalent (TEDE) to the Maximally Exposed Off-Site Individuals (MEOSI) using real time monitoring data obtained while the vitrification facility is in operation.

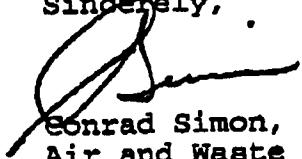
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- EPA inspectors will perform a visual inspection of the facility once it is in full operation.

EPA will make the determination on whether or not to grant final approval for the operation of these facilities based on the re-calculated TEDE using real time data and the inspection of the operational facility.

If there are any questions regarding this matter, please contact Paul A. Giardina of my staff at (212) 637-4010.

Sincerely,



Conrad Simon, Director
Air and Waste Management Division

cc: Paul Merges, NYDEC
John Karhnak, ORIA
Paul Giardina, AWM-RAD



454.1

Department of Energy

Idaho Operations Office
West Valley Project Office
P.O. Box 191
West Valley, NY 14171

September 29, 1993

Picked up
from Zack Wilcox's
desk

3-10-04 e

17:35

Mr. Paul A. Giardina
Regional Radiation Representative
Region II
MS-2AWM-RAD
United States Environmental Protection Agency
26 Federal Plaza
New York, NY 10278

SUBJECT: Air Permit Applications for the Emission of Radionuclides from the Vitrification Facility (VF) Heating, Ventilating, and Air Conditioning (HVAC) System and Slurry Fed Ceramic Melter

Dear Mr. Giardina:

Pursuant to the National Emission Standards for Hazardous Air Pollutants, two permit applications are enclosed for the emission of radionuclides from

1. The Vitrification Facility HVAC System, and
2. The Slurry Fed Ceramic Melter, located within the VF.

If you have any questions or comments, please contact Elizabeth Matthews of my staff at (716) 942-4930.

Sincerely,

Bethany G. MacGruder
T. J. Rowland, Director
West Valley Project Office

Enclosures: 1. VF HVAC Permit Application
2. Application

cc: J. MacGruder, EPA-Region II, w/enc.
B. Varcasio, NYSDEC-Albany, w/enc.
B. Bartz, NYSDEC-Buffalo, w/o enc.
B. A. Mazurowski, WVPO, w/o enc.
L. Salvatori, WVNS, MS B1L, w/o enc.

EAM:180:93 - 1147:93:10
1149:93:10

EAM/cch

WEST VALLEY PROJECT OFFICE CONCURRENCES

Date	Date Needed	Author	Action Number	Letter Number (Secretary's Use Only)	Record Number (Secretary's Use Only)
9/22/93	9/27/93	Matthews	1147:93:10 1149:93:10	EAM:190:93	27428 27429

Is a Quality Document? Y or N

Closes Above Record Number (this correspondence)? Y or N

Backup Correspondence Attached? Y or N

Closes Record Number (On Red Sheet) 26877/26878 C
CR CK

NAME	INITIALS	DATE	COMMENTS
P. Abrams	____	____	I would like to get these out by 9/27/93, if possible; Please circulate to other reviewers while I'm out this week. THANKS - Elizabet
A. Al-Daouk	____	____	
D. Cook	DCC	9/24/93	Reviewed letter only for awareness that these are being sent out.
J. Desormeau	____	____	
C. Eckert	____	____	
W. Hamel	____	____	
B. Hunt	____	____	
T. Jackson	____	____	
S. Ketola	____	____	
E. Matthews	E. Matthews	9/27/93 w/ comments	pls. go final
B. Nowakski	B. Nowakski	9/27	
H. Moore	____	____	
R. Proulx	R. Proulx	9/24/93	
T. Rowland	T. Rowland	9/27	
D. Sullivan	____	____	
A. Yeazel	____	____	
R. M. M	R. M. M	9/24/93	
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SECRETARY'S USE ONLY

TYPED: NAME C. Hopkins DATE 9/23/93 SYSTEM 915ASC AM
TRANSMITTED: NAME J. Schmitt DATE 9/29/93 METHOD REG.

Re-issued September 1, 1993, only change is page numbers not text

West Valley
Nuclear Services Company
Incorporated

RESPONSE:
DW:5849

P.O. Box 191
West Valley, New York 14171-0191
MS-50B
WD:93:1030
August 20, 1993

filed Reck/Eggers

Mr. T. J. Rowland, Director
West Valley Project Office
U. S. Department of Energy
MS-DOE
10282 Rock Springs Road
P. O. Box 191
West Valley, New York 14171-0191

ATTENTION: R. B. Provencher

Dear Mr. Rowland:

SUBJECT: Transmittal of Revised Environmental Protection Agency (EPA)
Air Permit Applications for the Emission of Radionuclides
from the Vitrification Facility (VF) HVAC System and Slurry
Fed Ceramic Melter

- REFERENCE:
- 1) Letter WD:93:0781 (1147:93:10, 1149:93:10),
L. C. Salvatori to T. J. Rowland, "Transmittal of
Revised Environmental Protection Agency (EPA) Air
Permit Application for the Emission of Radionuclides
from Slurry Fed Ceramic Melter (SFCM) in Vitrification
Facility," Dated June 25, 1993
 - 2) Letter WD:93:0782 (1147:93:10, 1149:93:10),
L. C. Salvatori to T. J. Rowland, "Transmittal of
Revised Environmental Protection Agency (EPA) Air
Permit Application for the Emission of Radionuclides
from the Vitrification Facility (VF) HVAC System,"
Dated June 25, 1993 (DW:5849)
 - 3) Letter EAM:127 (1147:93:10, 1149:93:10) T. J. Rowland
to W. G. Poulsen, "Review of Radionuclides NESHAP Air
Permit Applications for the Vitrification HVAC and
Slurry Fed Ceramic Melter," Dated August 5, 1993
(DW:5849)

Enclosed is the revised Air Permit applications for the exhaust of
Radionuclides from VF HVAC system and Slurry Fed Ceramic Melter.

Following your review of the application, please submit to:

Mr. Paul A. Giardina
Radiation Program Manager
United States Environmental
Protection Agency, Region II
26 Federal Plaza
New York, New York 10278

26878

Mr. T. J. Rowland

If you have any questions or comments, please feel free to call me at Ext. 4793 or A. K. Shukla of my staff at Ext. 4108.

Very truly yours,

WEST VALLEY NUCLEAR SERVICES CO., INC.



L. C. Salvatori, Manager
Environmental Permitting

BC:93:0143

AKS:ECW

- Attachment:
- 1) VF HVAC Permit Application
 - 2) SFCM Application
 - 3) Vitrification Mass Balance, Rev. 7

cc: E. A. Matthews, DOE-WV Project Office, MS-DOE



West Valley
Nuclear Services Company
Incorporated

RESPONSE:
DW:5849

file - Rick/Elizabeth
P.O. Box 191
West Valley, New York 14171-0191
MS-50B
WD:93:1030
August 20, 1993

Mr. T. J. Rowland, Director
West Valley Project Office
U. S. Department of Energy
MS-DOE
10282 Rock Springs Road
P. O. Box 191
West Valley, New York 14171-0191

ATTENTION: R. B. Provencher

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- REFERENCE:
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L. C. Salvatori to T. J. Rowland, "Transmittal of Revised Environmental Protection Agency (EPA) Air Permit Application for the Emission of Radionuclides from Slurry Fed Ceramic Melter (SFCM) in Vitrification Facility," Dated June 25, 1993
 - 2) Letter WD:93:0782 (1147:93:10, 1149:93:10),
L. C. Salvatori to T. J. Rowland, "Transmittal of Revised Environmental Protection Agency (EPA) Air Permit Application for the Emission of Radionuclides from the Vitrification Facility (VF) HVAC System," Dated June 25, 1993 (DW:5849)
 - 3) Letter EAM:127 (1147:93:10, 1149:93:10) T. J. Rowland to W. G. Poulsen, "Review of Radionuclides NESHP Air Permit Applications for the Vitrification HVAC and Slurry Fed Ceramic Melter," Dated August 5, 1993 (DW:5849)

Enclosed is the revised Air Permit applications for the exhaust of Radionuclides from VF HVAC system and Slurry Fed Ceramic Melter.

Following your review of the application, please submit to:

Mr. Paul A. Giardina
Radiation Program Manager
United States Environmental
Protection Agency, Region II
26 Federal Plaza
New York, New York 10278

-2-

Mr. T. J. Rowland

If you have any questions or comments, please feel free to call me at Ext. 4793 or A. K. Shukla of my staff at Ext. 4108.

Very truly yours,

WEST VALLEY NUCLEAR SERVICES CO., INC.

L. C. Salvatori
L. C. Salvatori, Manager
Environmental Permitting

BC:93:0143

AKS:ECW

Attachment: 1) VF HVAC Permit Application
2) SFCM Application
3) Vitrification Mass Balance, Rev. 7

cc: E. A. Matthews, DOE-WV Project Office, MS-DOE

NESHAP AIR PERMIT FOR OFF-GAS FROM SLURRY FED CERAMIC MELTER

TABLE OF CONTENTS

	Page
I. NAME AND ADDRESS OF APPLICANT	1
II. NAME AND LOCATION OF SOURCE	1
III. RELEASE POINT INFORMATION	1
IV. SITE HISTORY	2
V. IDENTIFICATION OF RADIONUCLIDES	2
VI. OVERVIEW OF OPERATIONS	2
VII. OVERVIEW OF VITRIFICATION SYSTEM	3
VIII. OFF-GAS SYSTEM	4
IX. VITRIFICATION SCHEDULE	6
X. SOURCE TERM DEVELOPMENT	6
XI. DOSE ASSESSMENT	6
XII. REFERENCES	7
XIII. LIST OF DRAWINGS	7

TABLES I AND II

REQUEST FOR APPROVAL TO CONSTRUCT OR MODIFY
SOURCES OF ATMOSPHERIC EMISSIONS OF RADIONUCLIDES

I. NAME AND ADDRESS OF APPLICANT

U. S. Department of Energy
West Valley Demonstration Project
MS - DOE
10282 Rock Springs Road
P.O.Box 191
West Valley, New York 14171-0191

Operating Contractor:

West Valley Nuclear Services Co., Inc.
10282 Rock Springs Road
P.O.Box 191
West Valley, New York 14171-0191

II. NAME AND LOCATION OF SOURCE

Name: Off-Gas from Slurry Fed Ceramic Melter (SFCM) in
Vitrification Building

Location: West Valley Demonstration Project
10282 Rock Springs Road
West Valley, New York 14171-0191

Facility Coordinates

Latitude	42 Degrees 27 Minutes N
Longitude	78 Degrees 39 Minutes W
State Plane Coordinate System (SPCS) For the Stack	
Easting	480641-9171
Northing	892769-1971
(Zone 3103 - Western New York)	
Estimated Date of Construction:	September 1993
Estimated Date of Start Up:	January 1996

III. RELEASE POINT INFORMATION

Emission Point ID:	15F-1
Ground Elevation (ft above MSL):	1,415
Stack Height (ft):	208
Height Above Structure (ft):	144
Inside Diameter (inches):	53
Exit Temperature (degrees F):	70-100
Exit Velocity (ft/sec):	60
Exit Volume (ACFM):	60,000

IV. AIR PERMIT INFORMATION

This Air Permit is being submitted for the modification to the existing EPA Air Permit # WVDP - 687-01.

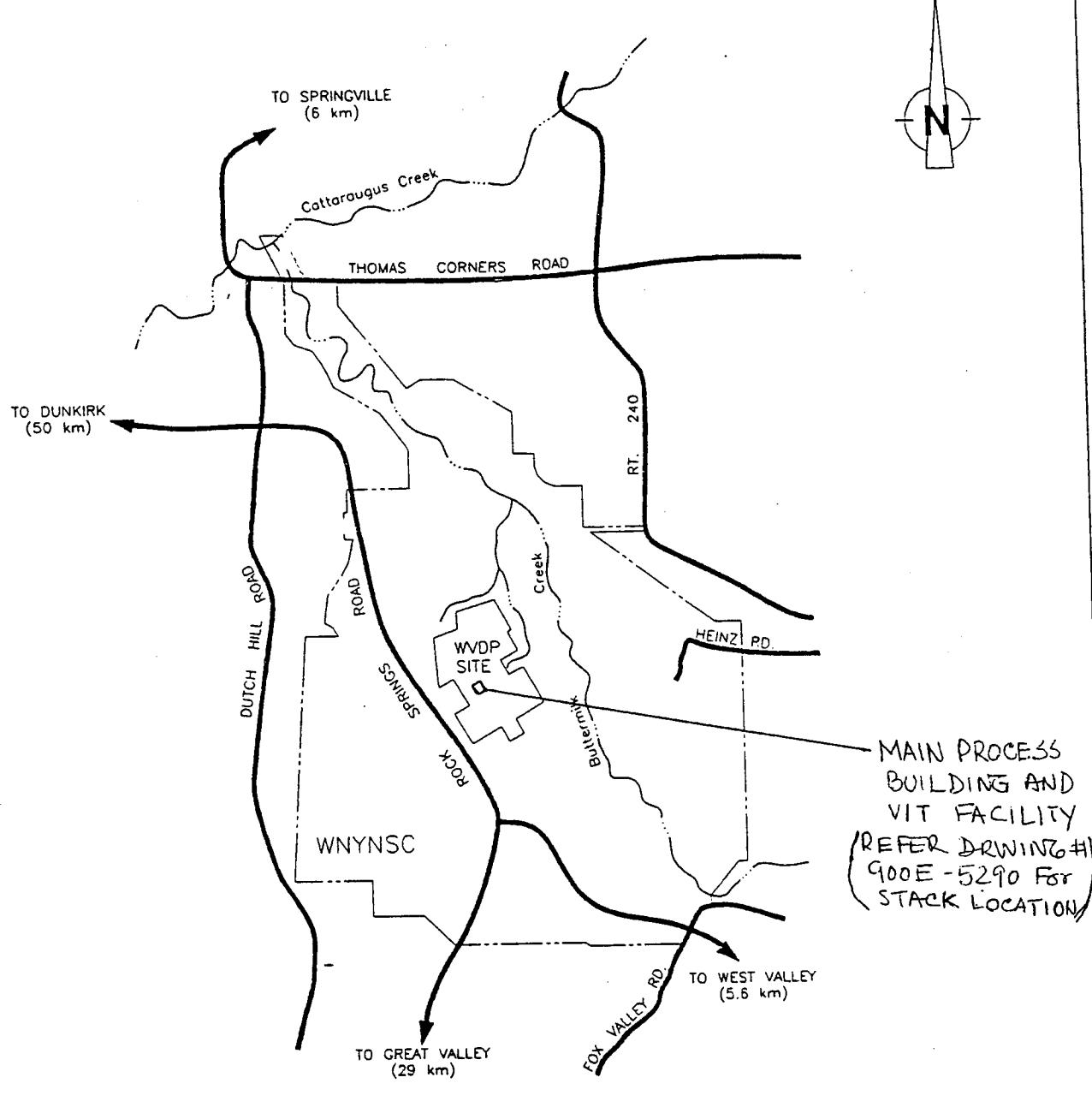
V. SITE HISTORY

The West Valley Demonstration Project (WVDP) is located on 200 acres within the 3,345 acre Western New York Nuclear Services Center (Map 1) in the town of Ashford, Cattaraugus County, New York (Map 2). Nuclear Fuel Services (NFS) operated this facility to reprocess spent nuclear fuel from 1966 until 1972, after which NFS notified the New York State Energy Research and Development Authority (NYSERDA) that it would not continue in the fuel reprocessing business.

The Vitrification Facility, where the stack 15F-1 is located, is shown on Map 1. The actual location of the stack 15F-1 can be found on Drawing #900E-5290, Rev. C. Map 3 presents the prevailing wind directions, speed and percent occurrence as recorded for the year 1992. As indicated on Map 2, the surrounding terrain is relatively flat. The base elevation of the VF Facility is 1,415 feet above mean sea level. The terrain on all sides of the VF Facility, except the SW quadrant, gradually increases in elevation from approximately 1,300 feet (m.s.l.) to 1,600 feet (m.s.l.). The terrain in the SW quadrant slopes steeply to an elevation of approximately 1,700 feet (m.s.l.). A more detailed topographic description can be found in Reference 4.

The West Valley Demonstration Project Act of October 1, 1980 (Public law 96-368), authorized the Department of Energy (DOE) to perform a high-level radioactive waste management demonstration project for the purpose of demonstrating the solidification of high-level radioactive waste (HLWs) for disposal. The WVDP site contains high-level radioactive waste, which resulted from nuclear fuel reprocessing operations performed at the site prior to 1973 by NFS. The mission of the Project also includes: disposing of low-level wastes; developing containers for the high and low-level wastes; transporting the waste to a Federal repository; and decontaminating and decommissioning Project facilities.

The HLW is contained in two underground tanks, identified as 8D-2 and 8D-4. The majority of the radioactivity is contained in Tank 8D-2, where the waste has settled to form two layers: a precipitated sludge and an overlying supernatant. The supernatant is being processed to remove water and salts prior to immobilizing the sludge into a borosilicate glass matrix. The supernatant is decontaminated with a low-level waste treatment system and solidified into a cement waste form. After supernatant processing, the sludge layer will be washed to remove salts. These salts will be decontaminated using zeolite ion-exchange columns and then immobilized in cement. Once the salts have



— WYNNSC BOUNDARY
— PROJECT SITE BOUNDARY

0 1 2 KILOMETERS
APPROX. SCALE

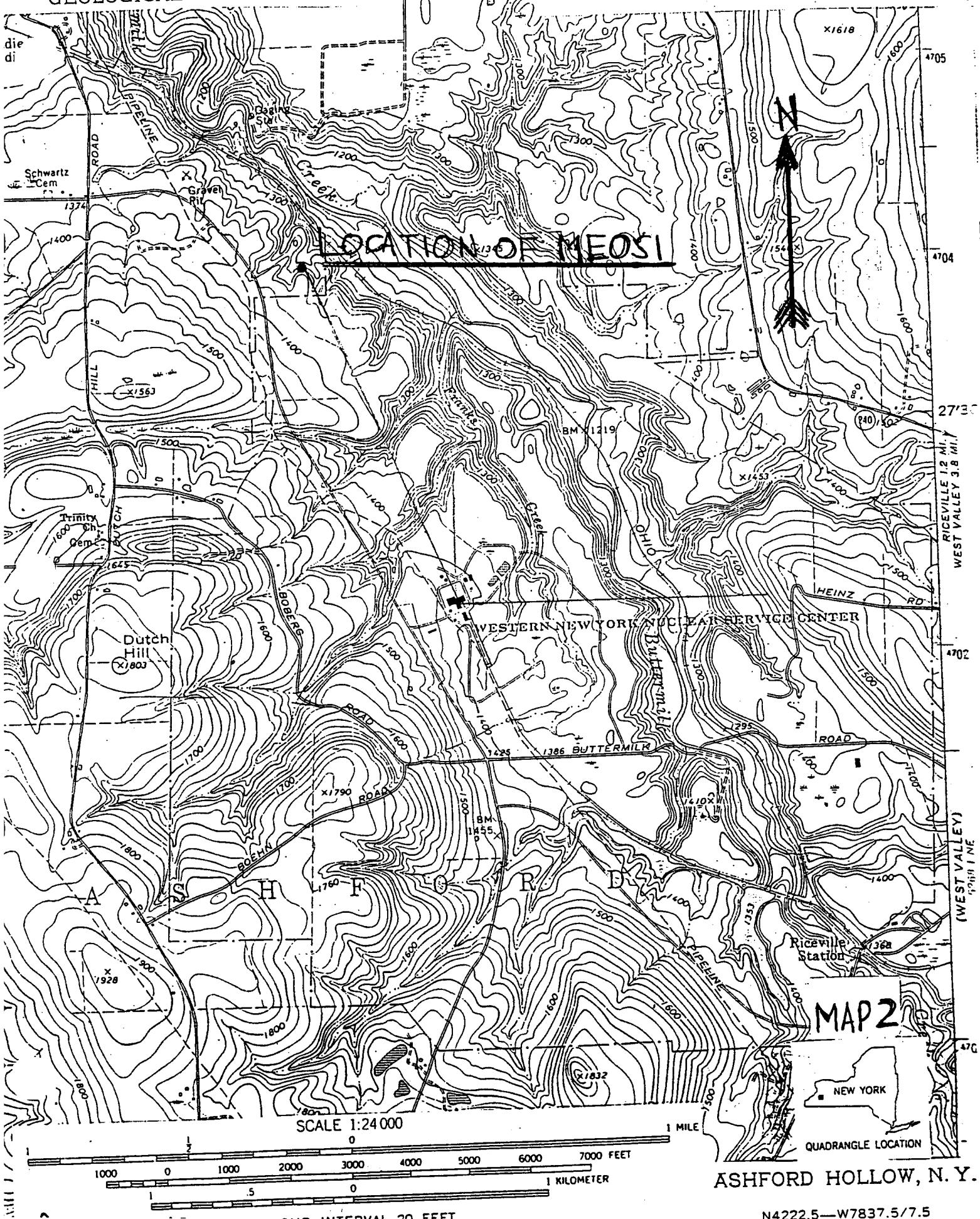
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MAP 1

LOCATION OF ROTNDY LINE

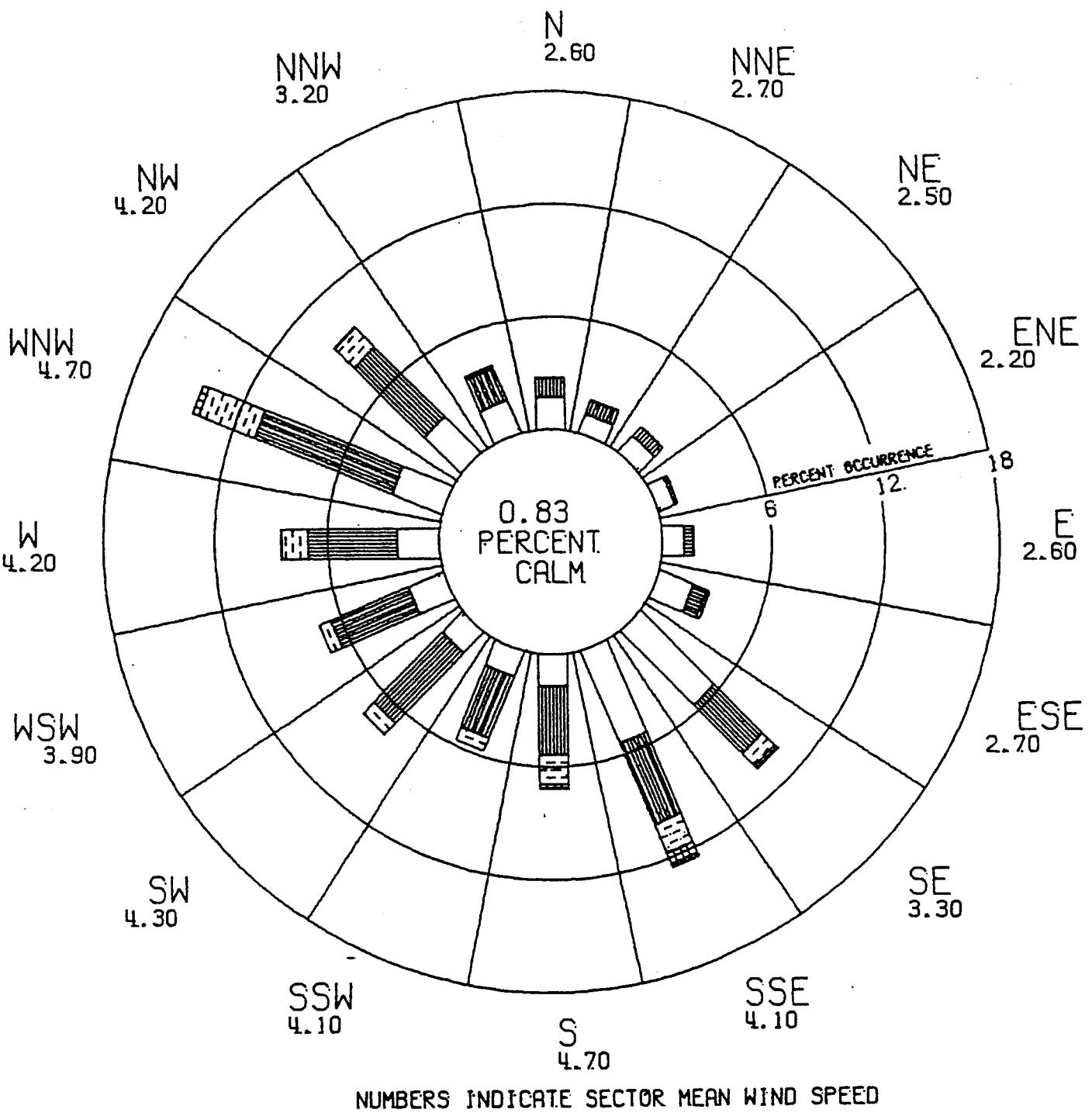
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

ASHFORD HOLLOW QUADRANGLE
NEW YORK.
7.5 MINUTE SERIES (TOPOGRAPHIC)



ASHFORD HOLLOW, N.Y.

N4222.5—W7837.5/7.5



WIND SPEED RANGE

- | | | |
|-------------------------------------|----------|-------|
| <input type="checkbox"/> | 0.0- 3.0 | M/SEC |
| <input checked="" type="checkbox"/> | 3.0- 6.0 | |
| <input type="checkbox"/> | 6.0- 9.0 | |
| <input type="checkbox"/> | 9.0-12.0 | |
| <input type="checkbox"/> | > 12.0 | |

WEST VALLEY NUCLEAR SERVICES
PRIMARY MONITORING STATION
WEST VALLEY, NEW YORK

60.0-METER WIND FREQUENCY ROSE
JANUARY 1, 1992 - DECEMBER 31, 1992

Figure C - 6.2

MAP 3

been effectively washed from the sludge, the zeolite ion-exchange media and the remaining sludge will be transferred to Tank 8D-2 and homogenized. The HLW will then be transferred to a Vitrification Facility (VF) and solidified in borosilicate glass with a Slurry-Fed Ceramic Melter (SFCM).

VI. IDENTIFICATION OF RADIONUCLIDES

Approximately 660,000 gallons of HLW was stored in the underground tanks when the Department of Energy (DOE) began the WVDP in 1982. The radionuclide content of Tank 8D-2 is listed in Table 1. Tank 8D-1 contains zeolite used in stripping off the radionuclides from the supernatant. The contents from tank 8D-1 and 8D-4 will be transferred to tank 8D-2. Tank 8D-2 will have a grinder/mixer pump to reduce the size, to mix and to homogenize the contents. The homogenized contents will be the feed to the VF Facility. Only the nuclides that constitute more than 0.1% of the total release are listed. A dispersion model was developed with this data and an CAP88-PC Computer Code (Attachment A). Other emission points and the location of these points are listed in Table 2 and Drawing 900E-5290, Rev. C.

VII. OVERVIEW OF OPERATIONS

The following sources are exhausted through the Main Plant stack 15F-1. Emissions from these sources are covered under the existing EPA Air Emissions Permit WVDP-687-01. Description of these processes and their emissions are described in details in that permit. Off-Gas exhaust from the Slurry-Fed Ceramic Melter (SFCM) will be exhausted through this stack. Description of the process and the emission sources are described in Sections VII and VIII of this application.

Analytical Chem Labs.

Radio.Chemistry Lab
Counting Room
Standard Preparation Lab
Vitrification Lab
Inductively Coupled Plasma Lab
Mass Spectrophotometry Lab

Liquid Waste Treatment System

Extraction Cell No 2 & 3
Uranium Product Cell
Uranium Loadout Room
Lower Warm Aisle
Upper Warm Aisle
Liquid Waste Cell
Extraction Chemical Room
Product Purification Cell
Chemical Operating Aisle
Lower Extraction Aisle
Upper Extraction Aisle

Fuel Receiving & Storage Bldg.

Head-End Ventilation (HEV) System

Master Slave Manipulator repair shop
General Purpose Cell
Process Mechanical Cell
Chemical Process Cell
Scrap Removal Room
Equipment Decontamination Room
Liquid Abrasive Decontamination Spray Booth.

Vessel Off-Gas (VOG) System

Waste Tank Farm off-Gas System

8D-1 High Level Waste (HLW) Tank
8D-2 HLW Tank
8D-3 HLW Tank
8D-4 HLW Tank

Low Level Waste Compactor

Temporary Ventilation System

VIII. OVERVIEW OF VITRIFICATION SYSTEM

The Vitrification System comprises components: for handling the HLW; solidifying the HLW into borosilicate glass; and treating any off-gas generated during the solidification process. These components are detailed in Figure 1. The entry and exit temperatures for all the components are also shown on this figure. The maximum temperature before the radionuclides passes through the HEPA filter #1 & 2 will be 85°C. This temperature is below 100°C. After the HEPA filter; the temperature of the exhaust gases is raised to 300°C to reduce NO_x emission.

VITRIFICATION FACILITY AND AIR EMISSION CONTROL SYSTEM

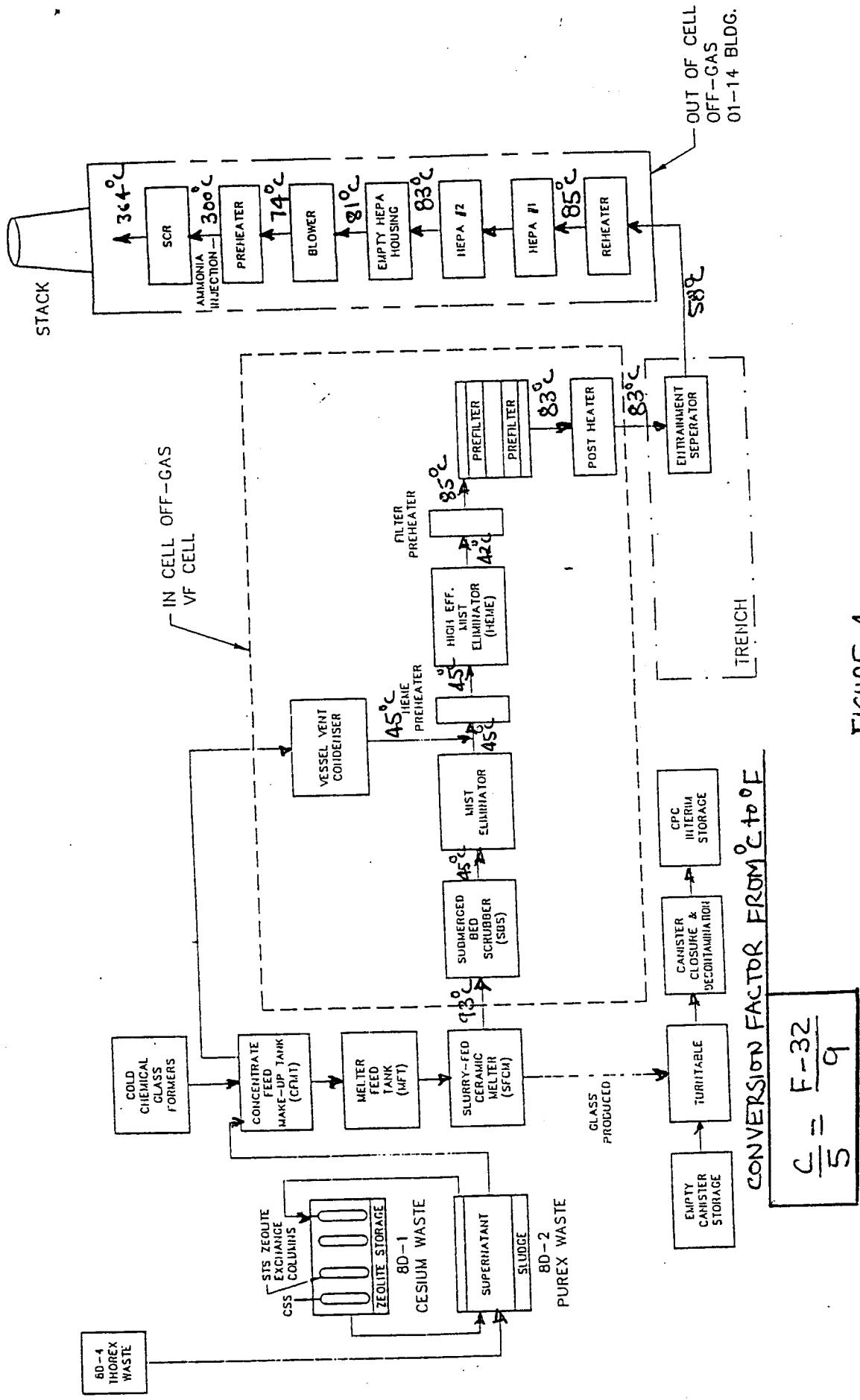


FIGURE 1

BC:93:0143

The HLW is transferred to the Concentrator Feed Make-up Tank (CFMT), where it will be mixed with process recycle streams, concentrated, and then mixed with cold chemical glass formers to form a slurry. The recycle streams are a product of canister decontamination and the Off-recycle Stream System. The CFMT off-gas is directed into a Vessel Vent Header and Condenser to remove excess water (Figure 2). The header routes the off-gas to the In-Cell Off-Gas System (Figure 3) and the condensate to Tank 8D-3, which serves as a holding tank. The In-Cell Off-Gas System is described in a separate section.

From the CFMT, the slurry will be transferred to the Melter Feed Hold Tank (MFHT); from there it is delivered to the SFCM at a rate of up to 150 L/hr. The SFCM is the main component of the Vitrification System. It operates on many of the same principles as commercial electrical glass melters. Water is evaporated from the slurry and the remaining solids calcine and melt into a molten glass pool that will be continually mixed and homogenized. The glass is heated by passing an alternating current between three electrodes in contact with the molten glass. The glass is maintained in the melter cavity at a temperature of 1100° to 1200° C. After approximately 50 hours of mean residence time in the melter, the molten glass is transferred into receiving canisters. The glass exits the melter at up to 40 kg/hr. The filled canisters will be allowed to cool, placed in temporary storage racks in the vitrification cell, sealed, decontaminated, and transferred to a shielded cell in the former reprocessing building that serves as interim storage – until a federal repository is available for permanent storage. Figure 4 is a schematic of the Vitrification System In-Cell equipment.

IX. OFF-GAS SYSTEM

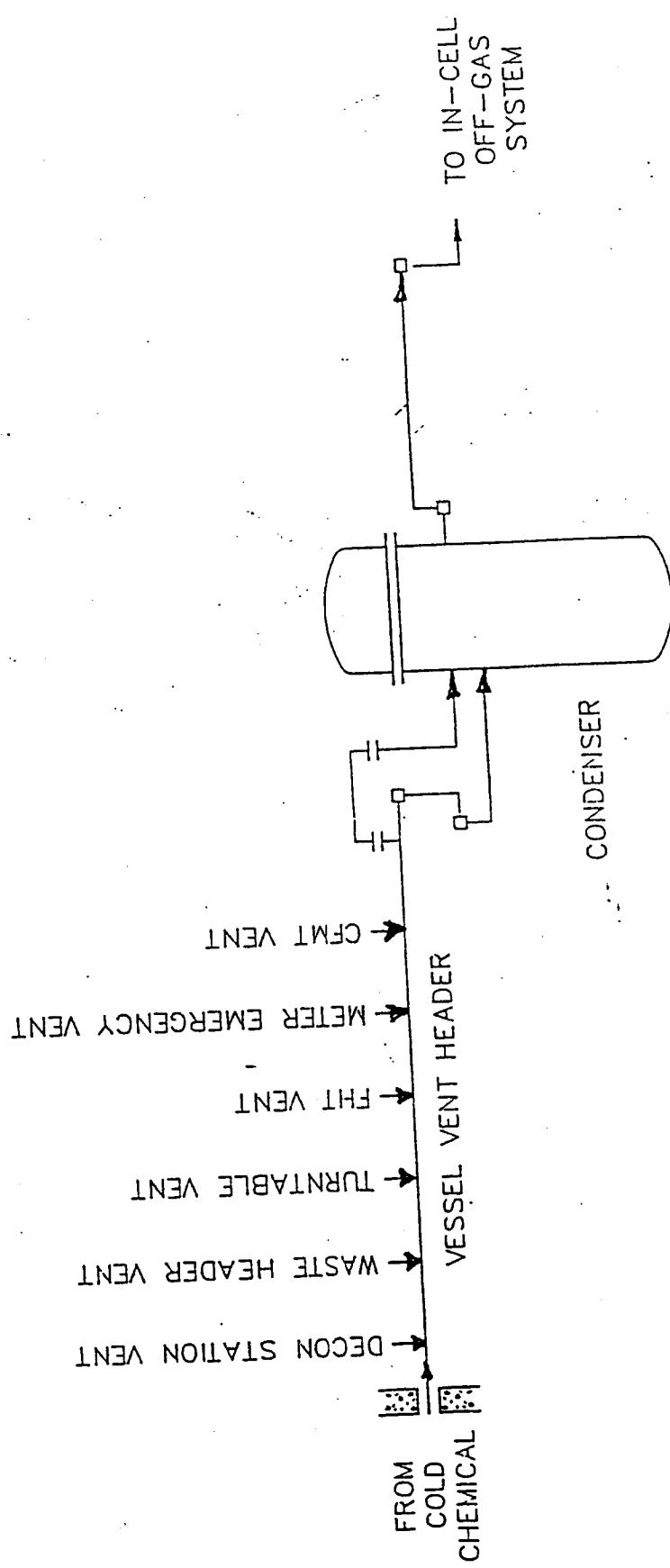
The off-gas system is designed to control the radioactive and chemical air pollutants generated from the CFMT and SFCM employed in the Vitrification Process. The Off-Gas System includes an In-Cell Off-Gas System and the Ex-Cell Off-Gas System.

Off-gases from the Slurry-Fed Ceramic Melter are treated for radionuclide removal before being exhausted through the Main Stack (15F-1).

In-Cell Off-Gas System

The Off-Gas is directed from the SFCM through a Film Cooler to the SBS. The Film Cooler is located at the beginning of the Off-Gas duct from the SFCM. It provides a boundary layer of clean air between the main stream of off-gas and the inner surface of the duct. The boundary prevents glass particles from adhering to the walls of the duct until the off-gas cools to a temperature below the glass melting point.

The In-Cell Off-Gas System maintains the SFCM at an absolute pressure lower than the cell that contains the Melter. The In-Cell Off-Gas system also provides high efficiency mist elimination, and prefiltration for the removal of radionuclides.



ENVIRONMENTAL COMPLIANCE WEST VALLEY DEMONSTRATION PROJECT PREPARED BY WNS CONCEPTUAL DRAWING		VESSEL VENTILATION SYSTEM	REV. DWG. NO.
BY: DATE:	BARTKOWSKI 06/06/90	060690-1	C

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Figure 2

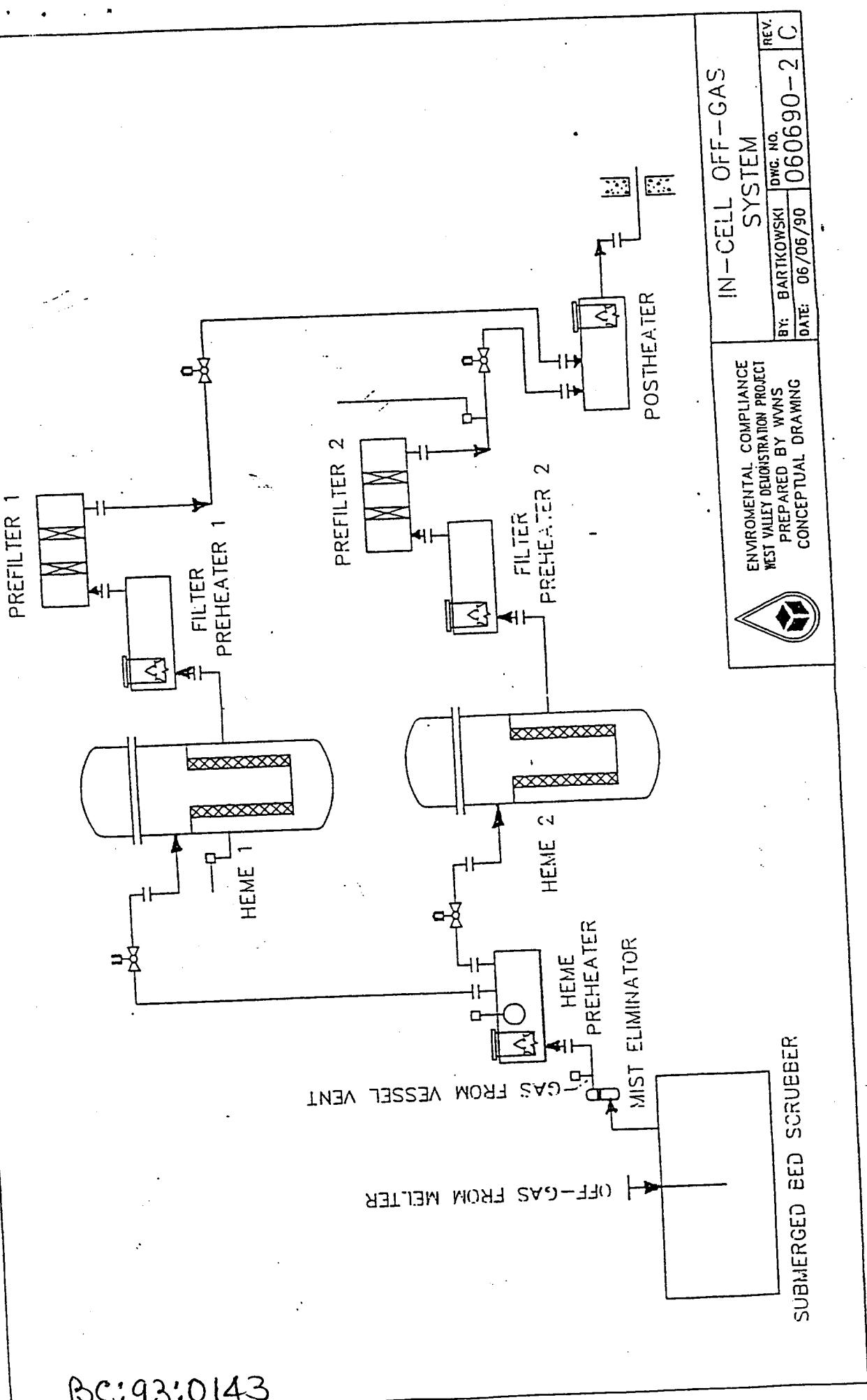


Figure 3

The In-Cell Off-Gas System (Figure 3) includes the Vessel Vent Header and Condenser; the Submerged Bed Scrubber (SBS); Mist Eliminator (ME); High Efficiency Mist Eliminator (HEME); heater; and a process prefilter that consists of two High Efficiency Particulate Air (HEPA) filter elements in series. A second HEME, heater, and prefilter unit are available to allow maintenance and change the filters (Figure 4).

The Vessel Vent Header (Figure 2) provides a mechanism to maintain the CFMT and MFHT at an absolute pressure lower than the vitrification cell for contamination control. The Header ventilates the concentrator feed hold tank, canister decontamination station, and Waste Header. The Vessel Vent Header transports vessel gas to a Condenser to remove water, which will be processed as low-level waste. The condensate is transported to Tank 8D-3 for storage. The non-condensable gases from the Vessel Vent stream flows into the In-Cell Off-Gas System upstream from the HEME Preheater (Figure 1).

The off-gas then enters the SBS (Figure 5), where gases are drawn by a vacuum to the bottom of a submerged bed of 9-mm diameter alumina spheres. The off-gas percolates through the bed, which causes the water vapor to condense and removes particulate from the gas. Sufficient vapor/liquid contact is provided to remove the large particulate. The gas is cooled from approximately 300° to 400° C to approximately 40° C, and the large particulate and about 99 percent of the radioactivity in the off-gas is removed. In a similar fashion, the SBS also removes from 3 to 8 percent of the NO_x.

As the water vapor condenses in the SBS, the inner tank will overflow to an outer (receiver) tank where the water (condensate) and water-soluble particulate will accumulate. Insoluble particulate removed by the scrubber will accumulate as a sludge in the bottom of the inner tank and periodically will be recycled to the CFMT with the accumulated condensate.

Gas leaving the SBS enters the Mist Eliminator, which removes liquid entrained in the gas as a result of the SBS treatment. This will limit the liquid load at the HEME. The HEME (Figure 6) is a glass mesh filter device used in commercial applications, which is capable of removal efficiencies above 95% for all particulate size ranges. The HEME will be equipped with a spray wash so that the filter element can be cleaned. The collected solution from the HEME will be drained and recycled to the SBS.

The gasses will be heated and prefiltered to capture small radioactive particulate. The prefilter will contain two HEPA filter elements, each of which will remove greater than 99% of the particulate 0.3 micron or larger. Differential pressure across the prefilters will be monitored. When the differential pressure reaches the point indicating that prefilter elements are fully loaded, an alternate process filter will be remotely placed in-line with the operation. When the Vitrification Off-Gas leaves the process prefilter, it will consist primarily of air, water vapor, NO_x and a small amount of SO₂ and particulate.

IN-CELL ARRANGE. INT

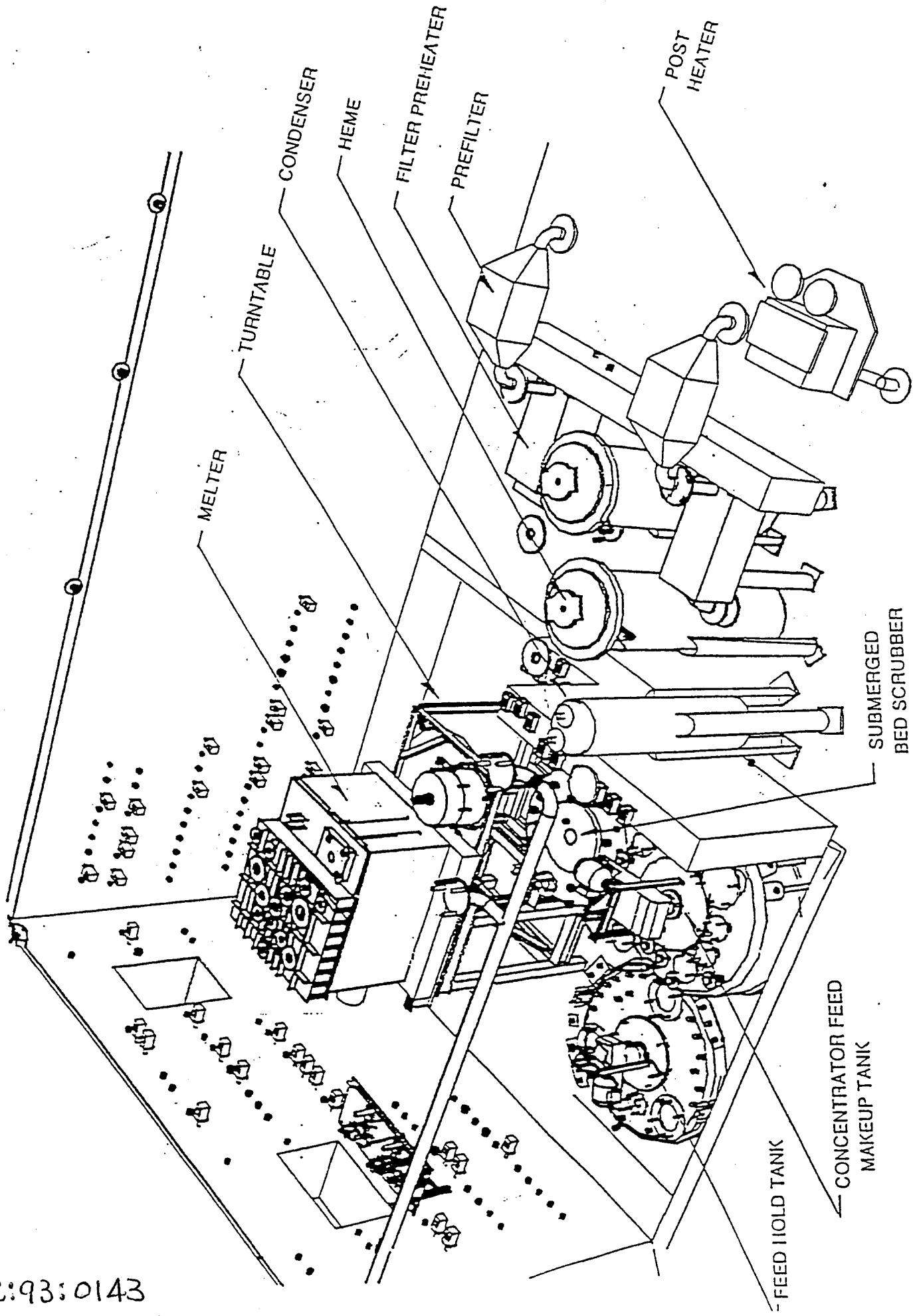


Figure 4-

BC:93:0143

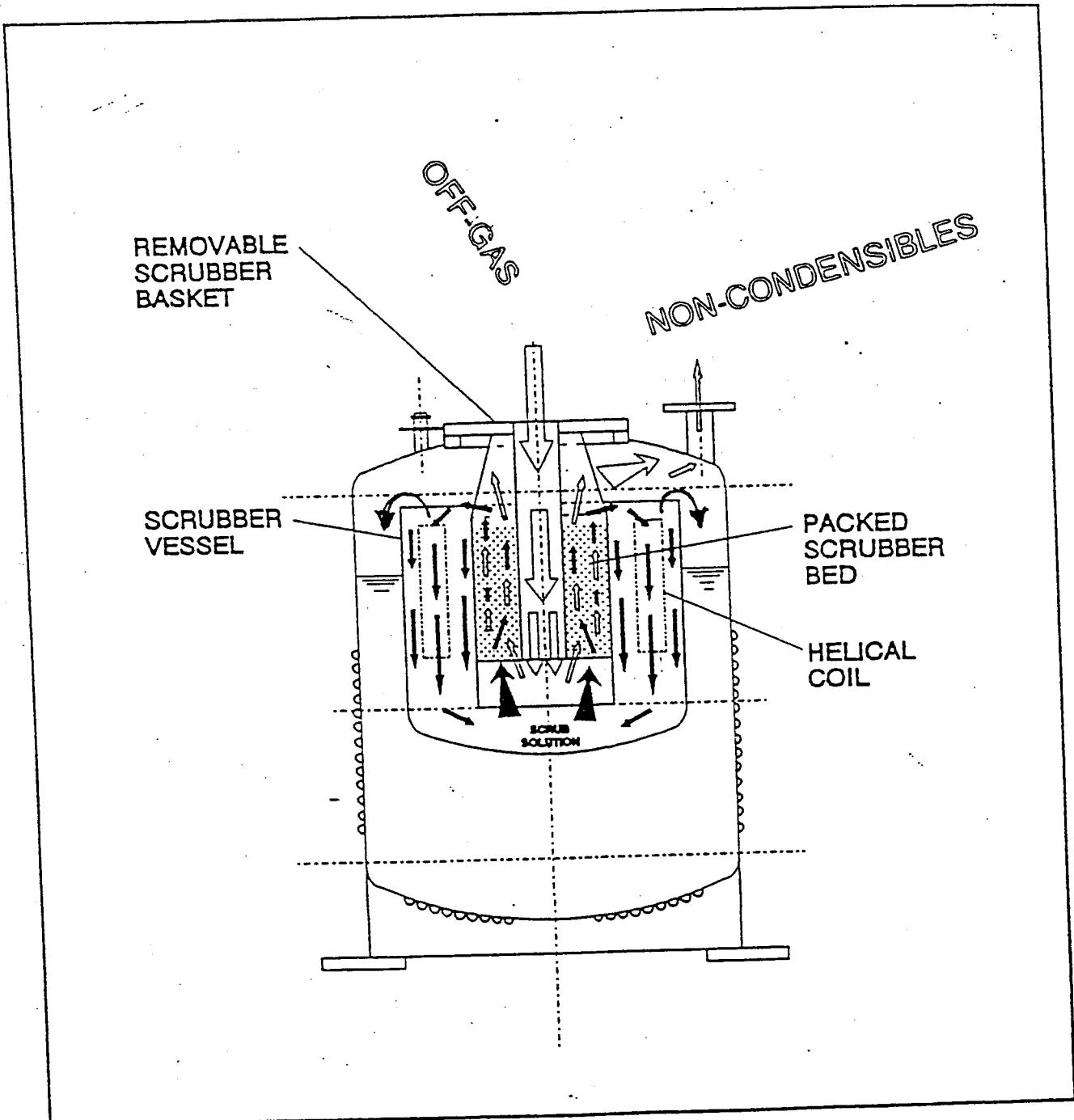


Figure .5
Submerged Bed Scrubber

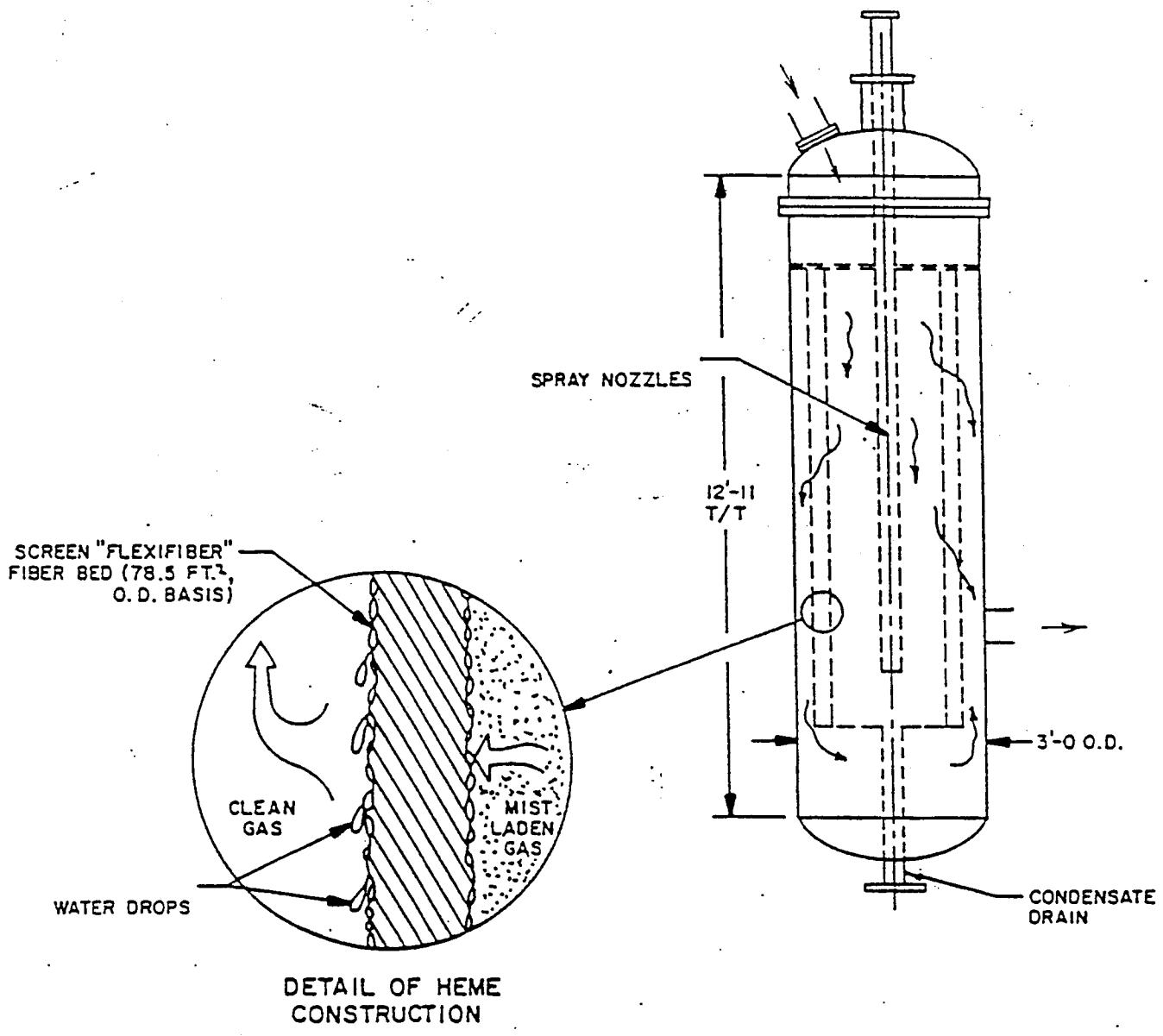


Figure 6
High Efficiency Mist Eliminator

BC:93:0143

The In-Cell off-Gas System essentially collects all the radioactive constituents. Process fluids are recycled back to the CFMT, and the gases are sent to the Ex-Cell Off-Gas System, located in the 01-14 Building, for final high efficiency filtration and NO_x removal.

Ex-Cell Off-Gas System

The Ex-Cell Off-Gas System (Figure 7) will receive off-gas from the In-Cell Off-Gas System and provide final HEPA filtration of any radioactive particulate not captured by the In-Cell System. The Ex-Cell System also will destroy NO_x gases produced by the vitrification process. The Ex-Cell processes include moisture removal, preheating, HEPA filtration, and catalytic NO_x destruction.

Off-gas from the VF will be directed to the 01-14 building through a duct in an underground tunnel. Insulation on the duct and an entrainment separator within the duct will be used to minimize or remove condensate from the off-gas. Liquid accumulated in the entrainment separator is collected, sampled, analyzed, and recycled or processed for discharge based on the results of the sample analysis.

After the entrainment separation, the gas is preheated to ensure that it enters the HEPA filters at a temperature above its dew point. The HEPA filtration removes approximately 99.997 percent of all the remaining particles. One HEPA train, which consists of two HEPA filters in series, is used while the other serves as a back up to allow maintenance or change of the filters. The integrity of the filter element to housing seals is verified by in-place dioctyl phthalate (DOP) testing. From the HEPA, NO_x and the off-gas will be transferred to a NO_x abatement system.

Following NO_x destruction, the treated off-gas will be directed to an existing main plant stack for discharge. Currently the main stack is being monitored for the emission of the radionuclides. Existing monitors at the main stack are capable of measuring the increased amount of air pollutants which will occur when the melter off-gas system comes on line in January 1996.

X. VITRIFICATION SCHEDULE

Vitrification of HLW is scheduled to begin in January 1996. Following is the tentative schedule for vitrification activities:

• Completion of Construction	January 1995
• Checkout of Process	March 95 - August 95
• Cold Operation Start/Finish	September 95 - December 95

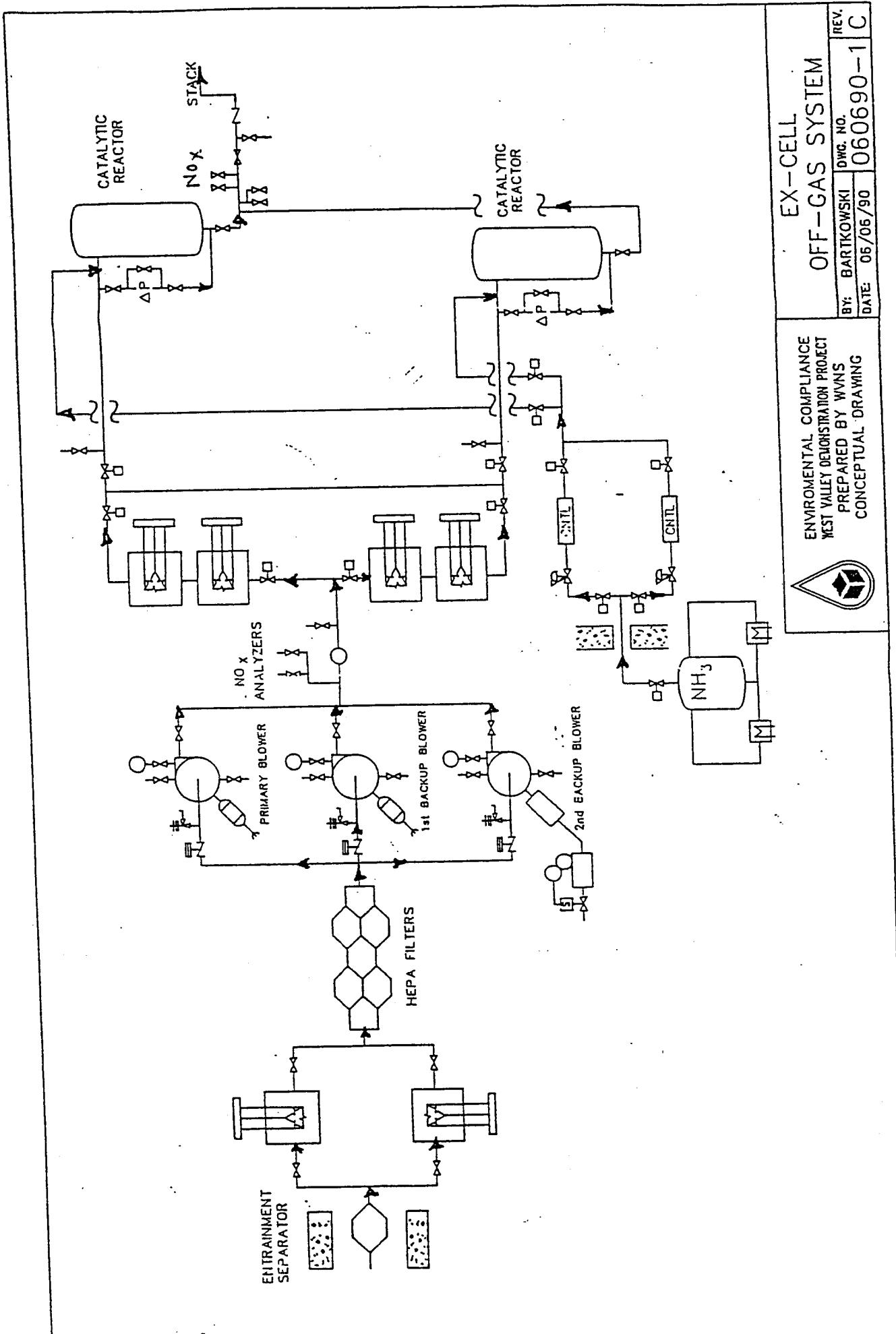


Figure : 7

- Hot Operation Start/Finish

January 96 - December 99

During cold operations, glass will be produced without HLW to determine any unforeseen problems.

XI. SOURCE TERM DEVELOPMENT

Prior to the start of vitrification, the contents from Tanks 8D-1 and 8D-4 will be transferred to Tank 8D-2 and mixed to make a homogeneous waste for feed to the Vitrification Facility. A complete list of the radionuclides contained in Tanks 8D-2 and 8D-4 can be found in Reference 3. The radionuclides listed in Table 1 represent only those nuclides that contribute greater than 0.1% of the total Effective Dose Equivalent (EDE) to the Maximally Exposed Off-Site Individuals (MEOSI). Total Curies in Table 1 represents the curies in the vitrification feed during the entire campaign, which has been estimated to have a duration of approximately three years. Functional and Checkout Testing of Systems (FACTS) performed from December 1984 through December 1989 used a mini melter to simulate the vitrification process. During FACTS, element specific Decontamination Factors (DFs) were developed for the vitrification off-gas control devices (Reference 1). These element-specific DFs are also given in Table 1. The amount of radioactivity discharged from the 60-meter Main Plant Stack (15F-1) for one year of operation was estimated using Tank 8D-2 contents and applying the element specific DFs (Table 1).

XII. DOSE ASSESSMENT

The EDE to MEOSI from the vitrification emissions out of the 60-meter Main Plant Stack (15F-1) was calculated using the CAP88-PC Computer Code (Attachment A). The amount of radioactivity released from stack 15F-1 was used as input to the code. Since the discharge would be an elevated release, the modeling was performed using the 60-meter five year average meteorological data collected at the on-site primary tower. The distance from the Main Plant Stack to the location of the nearest receptor in each of the sixteen compass sectors was also used as input into the code. The results of the model run indicate that the MEOSI is located approximately 1900 meters north-northwest from the Main Plant Stack (15F-1) and will receive an estimated EDE of 2.0E-01 mrem/year from the discharge.

The Effective Dose Equivalent from the main facility is measured to be 2.9E-04 mrem/yr for 1992 (Reference 2). Table 2 lists all the sources, stack height and diameter, exit velocity, and temperature of gases. Based on the airborne radioactivity released from the site during 1992, a person living in the vicinity of the WVDP was estimated to receive a total EDE of 1.1E-04 mrem. This hypothetical maximally exposed individual was assumed to reside continuously 1900 m NNW of the site.

This dose is well below the 10 mrem NESHAPs standard promulgated by the EPA. A more conservative NESHAPs assessment was also conducted using upper detection release rates for airborne radionuclides. The resulting EDE of 2.9E-04 mrem was a factor of 2.6 higher than this analysis (Reference 2).

In the abnormal analysis performed for this application and as prescribed in the "Guidance on Implementing the Radionuclide NESHAPs" issued by the US EPA July 1991, the only abnormal circumstance identified is the pluggage of HEPA filters. If the HEPA filters are not changed in time, pressure build up might cause the filters to release radioactive contaminants to the environment in excess of the permitted amount by EPA. There are two trains of HEPA filters, one operating and the other is bypass. When the differential pressure exceeds the set point an alarm will sound indicating that the HEPA filter needs replacement. The operator then manually closes the inlet valve to the operating air stream line and opens the bypass valve to let air go through the bypass line (Draw # 906E-011 Rev 6). This operating procedure eliminates the chance of increased emission thus increased exposure to the off-site individuals.

Possible abnormal circumstances that can be reasonably foreseen as a result of the operation of the equipment involved will be covered in a Safety Analysis Report (SAR) currently under preparation. A copy of this report can be provided when completed.

XIII. REFERENCE

- 1) " West Valley Demonstration Project Vitrification Process Equipment Functional and Checkout Testing of Systems (FACTS)," September 30, 1990, DOE/NE/44139-64.
- 2) West Valley Demonstration Project Site Environmental Report - 1992.
- 3) Letter EK:89-0232, R. L. Crocker to Distribution, "Vitrification Mass Balance Spreadsheet, Revision Number 7," Dated October 10, 1989.
- 4) WVNS - SAR 001 "Project overview and general information - Chapter 3", dated June 11, 1993.

XIV. LIST OF DRAWINGS

900E-705 Abbreviations and Legend P & ID, Sheet 1
900E-705 CTS Concentrator Feed Make-Up Tank 63-V-001 P & ID, Sheet 2
900E-705 Melter Feed Hold Tank 63-V-011 P & ID, Sheet 3
900E-705 Primary Scrubber Scrub Section, Sheet 14 & 15
900E-705 Melter Off-Gas System, Pre-Heater And HEME P & ID, Sheet 21
900E-705 Vessel Off-Gas, Filters and Heaters P & ID, Sheet 22
900E-705 Ex-Cell Vent Header P & ID, Sheet 25
900E-705 Index Vitrification & 01-14, Sheet 1
900E-705 CTS Vessel Vent System, Sheet 19
900E-705 Turn Table, Sheet 12
900E-705 Canister Decontamination Tank 63-V-044, Sheet 23
900E-705 Canister Welding Station 63-V-049, Sheet 24
15R-A-74 P & ID - Controlled Ventilation System Below Grade to El
131'
15R-A-75 P & ID - Controlled Ventilation System Above El 131'
900E-5290 WVDP Site Map - Radiological Emission Source Points
Rev. C (Information Copy)
906E-011 Vit Facility P&ID Melter Ex-cell Off-gas system
Rev. 6

TABLE 1

LIST OF RADIONUCLIDES THAT CONTRIBUTE GREATER THAN 0.1% OF THE EDE

JUNE 1993

NUCLIDES	TOT. CURIES	CURIOS/YR	DF PER NRC	DISCHARGE Ci/Year
C-14	5.49E-01	1.83E-01	1.00E+00	1.83E-01
Sr-90	5.81E+06	1.94E+06	4.95E+09	3.91E-04
Tc-99	1.09E+02	3.63E+01	1.00E+04	3.63E-03
I-129	1.81E-01	6.02E-02	2.00E+00	3.01E-02
Cs-137	6.28E+06	2.09E+06	1.09E+08	1.92E-02
Ac-227	9.43E+00	3.14E+00	1.00E+09	3.14E-09
Pu-238	7.92E+03	2.64E+03	4.95E+09	5.33E-07
Pu-239	1.63E+03	5.42E+02	4.95E+09	1.09E-07
Pu-240	1.19E+03	3.98E+02	4.95E+09	8.04E-08
Pu-241	6.04E+04	2.01E+04	4.95E+09	4.07E-06
Am-241	5.36E+04	1.79E+04	4.95E+09	3.61E-06
Am-242m	2.89E+02	9.63E+01	4.95E+09	1.94E-08
Am-243	3.47E+02	1.16E+02	4.95E+09	2.33E-08
Cm-243	1.16E+02	3.86E+01	1.00E+09	3.86E-08
Cm-244	6.07E+03	2.02E+03	1.00E+09	2.02E-06

*NOTE - Radionuclides content of Tank 8D-2

TABLE 2

SUMMARY OF POTENTIAL RADIOLOGICAL DISCHARGE POINTS AT THE WVDP

JUNE 1993					
E.P.	DESCRIPTION	PERMIT #	EDE/Yr & MONITOR.	STACK HT/DIA (Ft/In)	STACK EXT. VEL/TEMP (F/S/°F)
01*	Main Process Bldg Ventilation.	WVDP-687-01	> 0.1 mrem. Stack monitoring done	208/54	60/100
02	Portable Ventil. Unit	WVDP-587-01	< 0.0001 mrem. No monitoring done	Var/5-10	30-61.2/70
03	Low-Level Waste Comp.	WVDP-487-01	< 0.01 mrem. No monitoring done.	18/9.5	27/70
04	Supernatant Treatment System Ventilation.	WVDP-387-01	> 0.10 mrem. Monitoring done.	33/18.5	35-66/100
05	Contact Size Reduction	WVDP-287-01	0.12 mrem. Monitoring done.	195/21	42/100
06	Cement System Ventilation	WVDP-107-01	4.3 mrem. Monitoring done.	73/23.6	50/100
07	Low-Level Waste Treatment Facility	No Permit EDE < 0.1 mrem	0.005 mrem. No monitoring	10/18	40/70
08	Laundry	No Permit EDE < 0.1 mrem	0.0009 mrem. Periodic conf. measurement.	10/12	75/75
09	Low Level Storage	No Permit	0.005 mrem	-----	-----

TABLE 2 (Continued)

E.P	DESCRIPTION	PERMIT #	EDE/Yr & MONITOR.	STACK HT/DIA (Ft/In)	STACK EXT. VEL/TEMP (F/S/°F)
	Building	EDE < 0.1 mrem	No monitoring.	-----	-----
10	Drum Cell	No Permit EDE < 0.01 mrem	<0.01 mrem No monitoring.	-----	-----
11	CPC Storage Bldg.	No Permit EDE < 0.1 mrem	0.08 mrem No monitoring.	-----	-----
12	NDA Interc. Trench Pretreatment System	No Permit EDE < 0.1 mrem	0.0008 mrem No monitoring.	-----	-----
13	Environmental Lab	No Permit	0.00005 mrem	-----	-----
	Ventilation	EDE < 0.1 mrem	No monitoring.	-----	-----
14	Vit Facility HVAC System	New Permit applied.	0.00095 mrem.	75/36	55.6/90
15*	Slurry-Fed Ceramic Melter Off-Gas System	New Permit (mod) applied.	0.20 mrem.	208/54	60/100
	Emission Point 15 is same as Emission Point 01. This new permit will be a modification to the existing permit WVDP-687-01.				

TABLE 3

ESTIMATED DISCHARGE OF RADIONUCLIDES FROM THE MAIN STACK 15F-1

ASSUMPTION: MEASURED RELEASE FROM THE STACK 15F-1 IN 1992 WILL REMAIN MORE OR LESS SAME IN YEAR 1996.

RADIONUCLIDE	MEASURED RELEASE RATE IN 1992	ESTIMATED RELEASE RATE FROM OFF-GAS MELTER SYSTEM 1996 - 1999	TOTAL ESTIMATED RELEASE RATE 1996 - 1999
C-14	*	1.83E-01	1.83E-01
Sr-90	5.11E-06	3.91E-04	3.96E-04
Tc-99	*	3.6E-03	3.6E-03
I-129	6.94E-06	3.01E-02	3.012E-02
Cs-137	1.9E-05	1.92E-02	1.922E-02
Cs-134	< 8.89E-08	*	< 8.89E-08
Co-60	< 8.92E-08	*	< 8.92E-08
Ac-227	*	3.14E-09	3.14E-09
Eu-154	< 2.51E-07	*	< 2.51E-07
U-232	< 3.14E-08	*	< 3.14E-08
U-233/234	< 2.46E-08	*	< 2.46E-08
U-235	< 1.88E-08	*	< 1.88E-08
U-236	< 2.02E-08	*	< 2.02E-08
U-238	< 1.96E-08	*	< 1.96E-08
Pu-238	< 4.11E-08	5.33E-07	5.74E-07
Pu-239	6E-08	1.09E-07	1.69E-07
Pu-240	6E-08	8.04E-08	1.404E-07
Pu-241	*	4.07E-06	4.07E-06
Am-241	2.08E-07	3.61E-06	3.82E-06
Am-242m	*	1.94E-08	1.94E-08
Am-243	*	2.33E-08	2.33E-08
Cm-243	*	3.86E-08	3.86E-08
Cm-244	*	2.02E-08	2.02E-08

Attachment A

C A P 8 8 - P C

Version 1.00

Clean Air Act Assessment Package - 1988

D O S E A N D R I S K E Q U I V A L E N T S U M M A R I E S

Non-Radon Individual Assessment
Apr 14, 1993 2:28 pm

Facility: West Valley Demonstration Project
Address: P. O. Box 191
Rock Springs Road
City: West Valley
State: NY Zip: 14171-0191

Source Category: Vitrification Facility (SFCM) Off-Gas
Source Type: Stack
Emission Year: 1996

Comments: Emission Point: Main Plant Stack (60 meters)

Dataset Name: SFCM Permit Appl
Dataset Date: Apr 14, 1993 2:28 pm
Wind File: WNDFILES\SYRAV60M.WND

BC:93;0143

pr 14, 1993 2:28 pm

SYNOPSIS
Page 2

RADIOMUCLIDE EMISSIONS DURING THE YEAR 1996

Nuclide	Class	Size	Source	TOTAL Ci/y
			#1 Ci/y	
C-14	*	0.00	1.8E-01	1.8E-01
SR-90	D	1.00	3.9E-04	3.9E-04
Y-90	Y	1.00	3.9E-04	3.9E-04
I-129	D	1.00	3.0E-02	3.0E-02
CS-137	D	1.00	1.9E-02	1.9E-02
BA-137M	D	1.00	1.9E-02	1.9E-02
AM-241	W	1.00	3.6E-06	3.6E-06
AC-227	Y	1.00	3.1E-09	3.1E-09
PU-238	Y	1.00	5.3E-07	5.3E-07
PU-239	Y	1.00	1.1E-07	1.1E-07
PU-240	Y	1.00	8.0E-08	8.0E-08
PU-241	Y	1.00	4.1E-06	4.1E-06
AM-242M	W	1.00	1.9E-08	1.9E-08
AM-243	W	1.00	2.3E-08	2.3E-08
-243	W	1.00	3.9E-08	3.9E-08
AM-244	W	1.00	2.0E-06	2.0E-06
TC-99	W	1.00	3.6E-03	3.6E-03

SITE INFORMATION

Temperature: 10 degrees C
Precipitation: 100 cm/y
Mixing Height: 1000 m

BC:93:0143

pr 14, 1993 2:28 pm

SYNOPSIS
Page 3

SOURCE INFORMATION

Source Number: 1

Stack Height (m): 63.40
Diameter (m): 1.35

Plume Rise
Momentum (m/s): 1.83E+01
(Exit Velocity)

AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	0.700	0.399	0.442
Fraction From Assessment Area:	0.300	0.601	0.558
Fraction Imported:	0.000	0.000	0.000

Food Arrays were not generated for this run.
Default Values used.

DISTANCES USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

1300	1400	1800	1900	2100	2300	2400	2500	2600	2700
2900		3400							

BC:93:0143

Apr 14, 1993 2:28 pm

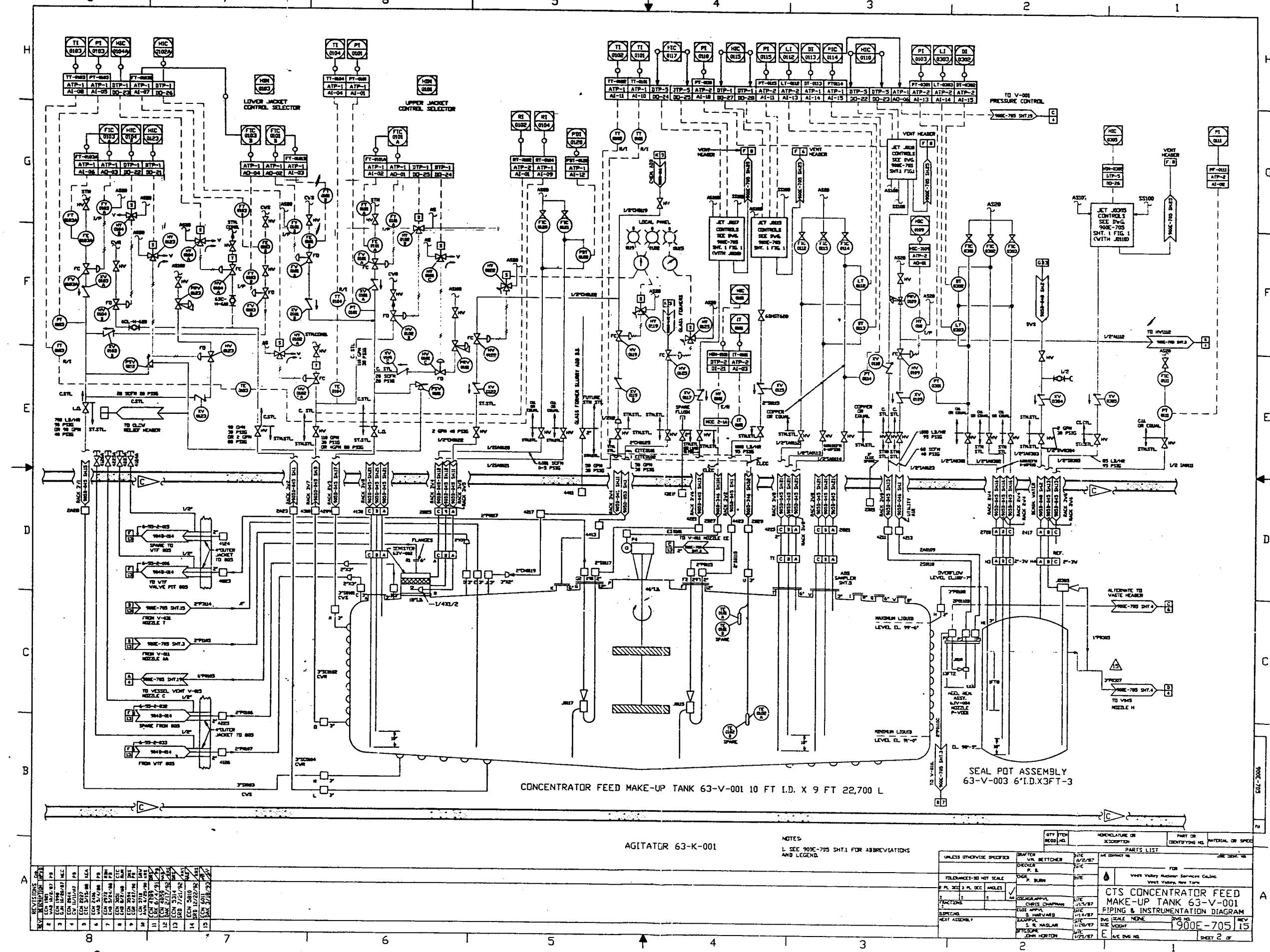
SUMMARY

INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)
(All Radionuclides and Pathways)

Direction	Distance (m)						
	1300	1400	1800	1900	2100	2300	2400
N	1.6E-01	1.6E-01	1.6E-01	1.6E-01	1.5E-01	1.5E-01	1.4E-01
NNW	2.2E-01	2.2E-01	2.1E-01	2.0E-01*	2.0E-01	1.9E-01	1.9E-01
NW	1.3E-01	1.3E-01	1.3E-01	1.3E-01	1.2E-01	1.2E-01	1.2E-01
WNW	9.7E-02	9.6E-02	9.2E-02	9.1E-02	8.8E-02	8.6E-02	8.5E-02
W	9.1E-02	9.0E-02	8.7E-02	8.6E-02	8.4E-02	8.2E-02	8.1E-02
WSW	9.0E-02	8.9E-02	8.5E-02	8.4E-02	8.2E-02	8.1E-02	8.0E-02
SW	1.0E-01	1.0E-01	9.7E-02	9.5E-02	9.2E-02	8.9E-02	8.8E-02
SSW	1.0E-01	1.0E-01	9.5E-02	9.4E-02	9.1E-02	8.8E-02	8.7E-02
S	1.3E-01	1.2E-01	1.1E-01	1.1E-01	1.1E-01	1.0E-01	1.0E-01
SSE	1.6E-01	1.6E-01	1.4E-01	1.4E-01	1.3E-01	1.3E-01	1.2E-01
SE	2.4E-01	2.4E-01	2.1E-01	2.0E-01	1.9E-01	1.8E-01	1.8E-01
ESE	2.3E-01	2.2E-01	2.0E-01	2.0E-01	1.9E-01	1.8E-01	1.7E-01
E	1.9E-01	1.9E-01	1.8E-01	1.7E-01	1.6E-01	1.6E-01	1.5E-01
ENE	1.9E-01	1.9E-01	1.8E-01	1.7E-01	1.7E-01	1.6E-01	1.6E-01
NE	1.6E-01	1.6E-01	1.5E-01	1.5E-01	1.5E-01	1.4E-01	1.4E-01
NNE	1.3E-01	1.3E-01	1.3E-01	1.3E-01	1.2E-01	1.2E-01	1.2E-01
Direction	Distance (m)						
	2500	2600	2700	2900	3400		
N	1.4E-01	1.4E-01	1.4E-01	1.3E-01	1.2E-01		
NNW	1.8E-01	1.8E-01	1.8E-01	1.7E-01	1.5E-01		
NW	1.1E-01	1.1E-01	1.1E-01	1.1E-01	9.8E-02		
WNW	8.4E-02	8.3E-02	8.2E-02	8.0E-02	7.6E-02		
W	8.0E-02	8.0E-02	7.9E-02	7.7E-02	7.3E-02		
WSW	7.9E-02	7.8E-02	7.7E-02	7.5E-02	7.2E-02		
SW	8.7E-02	8.5E-02	8.4E-02	8.2E-02	7.7E-02		
SSW	8.5E-02	8.4E-02	8.3E-02	8.1E-02	7.6E-02		
S	9.9E-02	9.7E-02	9.5E-02	9.2E-02	8.6E-02		
SSE	1.2E-01	1.2E-01	1.2E-01	1.1E-01	1.0E-01		
SE	1.7E-01	1.7E-01	1.6E-01	1.5E-01	1.4E-01		
ESE	1.7E-01	1.7E-01	1.6E-01	1.5E-01	1.4E-01		
E	1.5E-01	1.5E-01	1.4E-01	1.4E-01	1.2E-01		
ENE	1.5E-01	1.5E-01	1.5E-01	1.4E-01	1.3E-01		
NE	1.4E-01	1.3E-01	1.3E-01	1.3E-01	1.2E-01		
NNE	1.2E-01	1.1E-01	1.1E-01	1.1E-01	1.0E-01		

Shaded values indicate the location of the nearest residence in each sector.
* Location of maximally exposed off-site individual.

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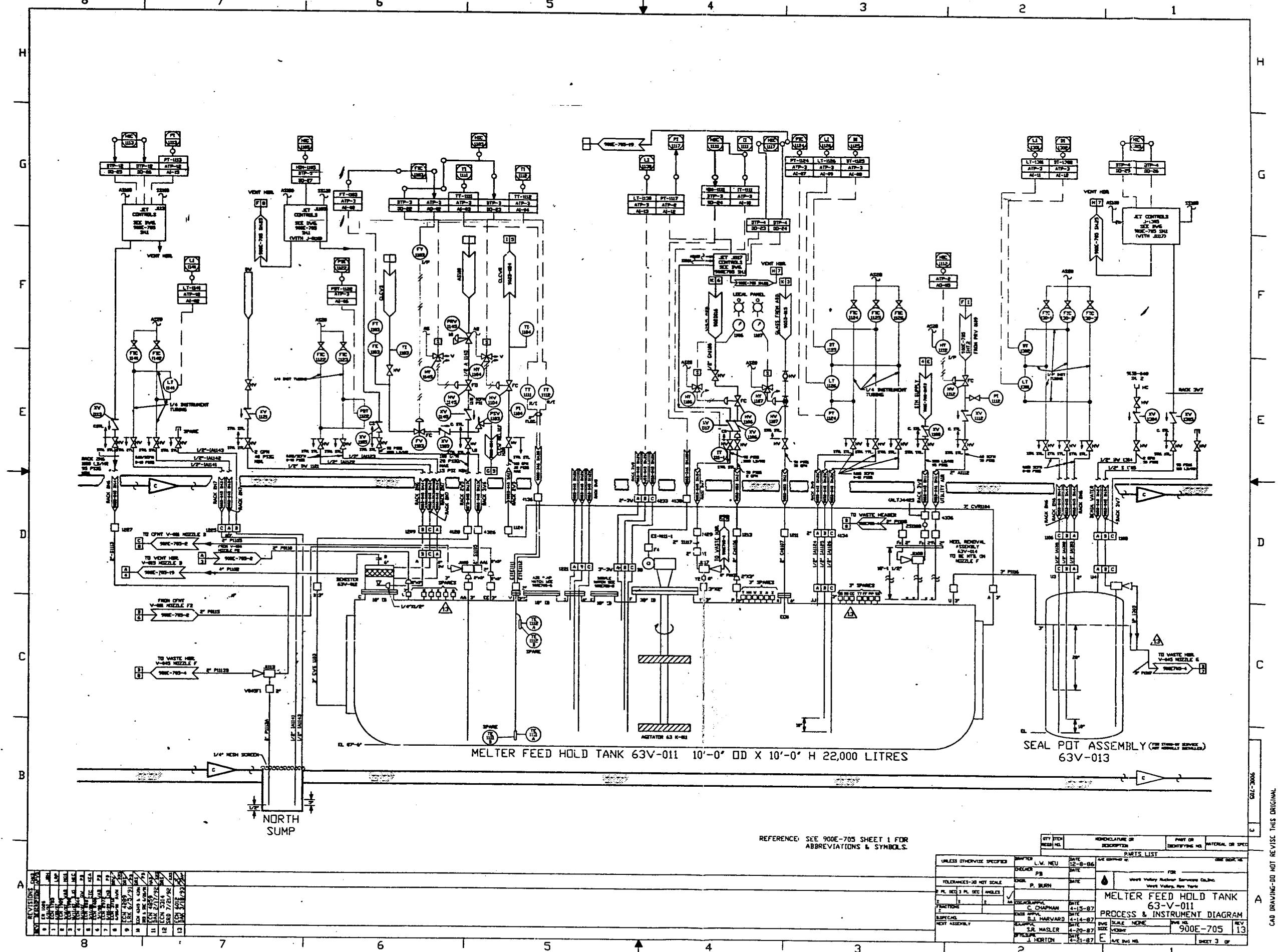
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AUG 1 9 '87

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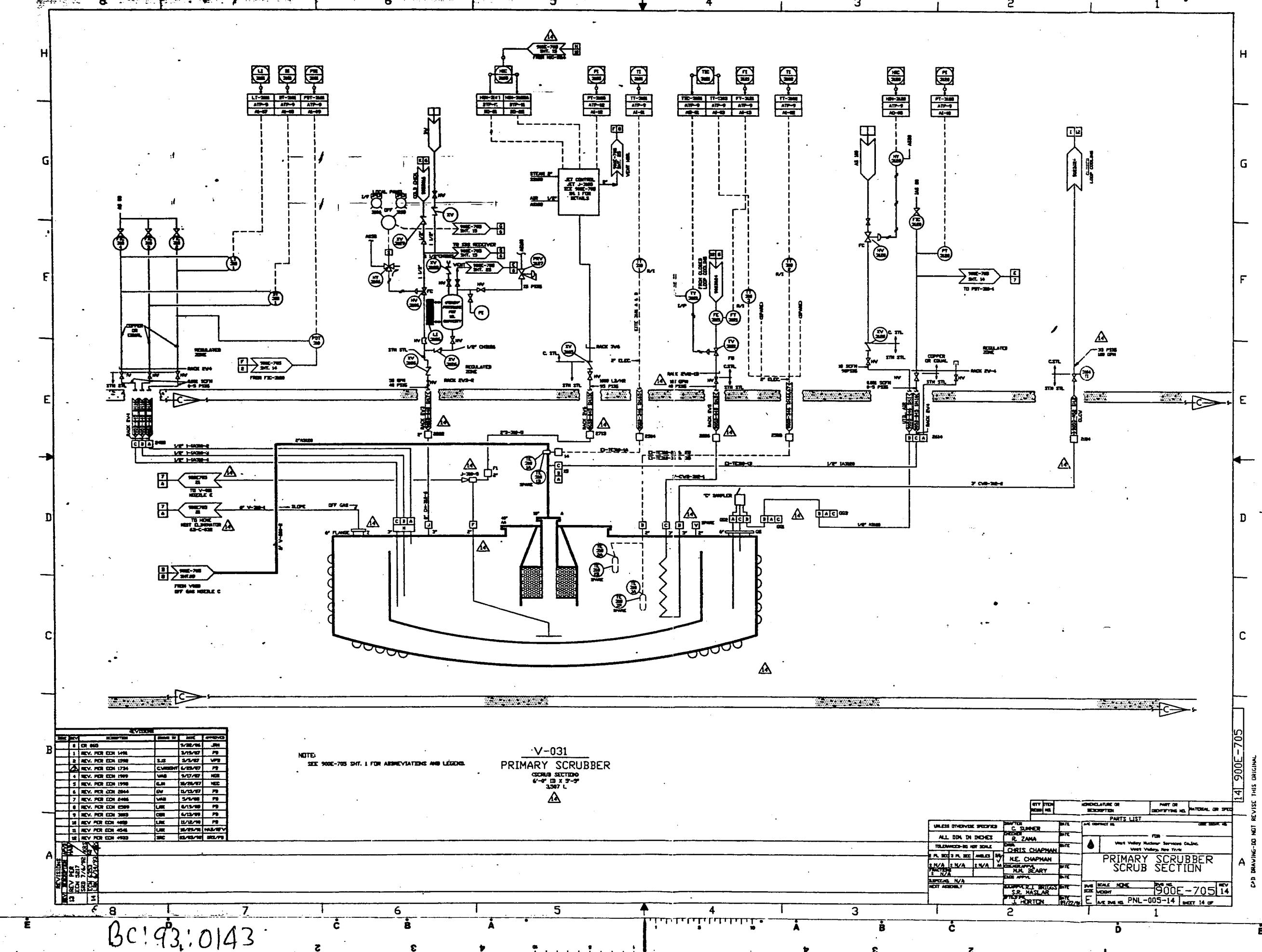
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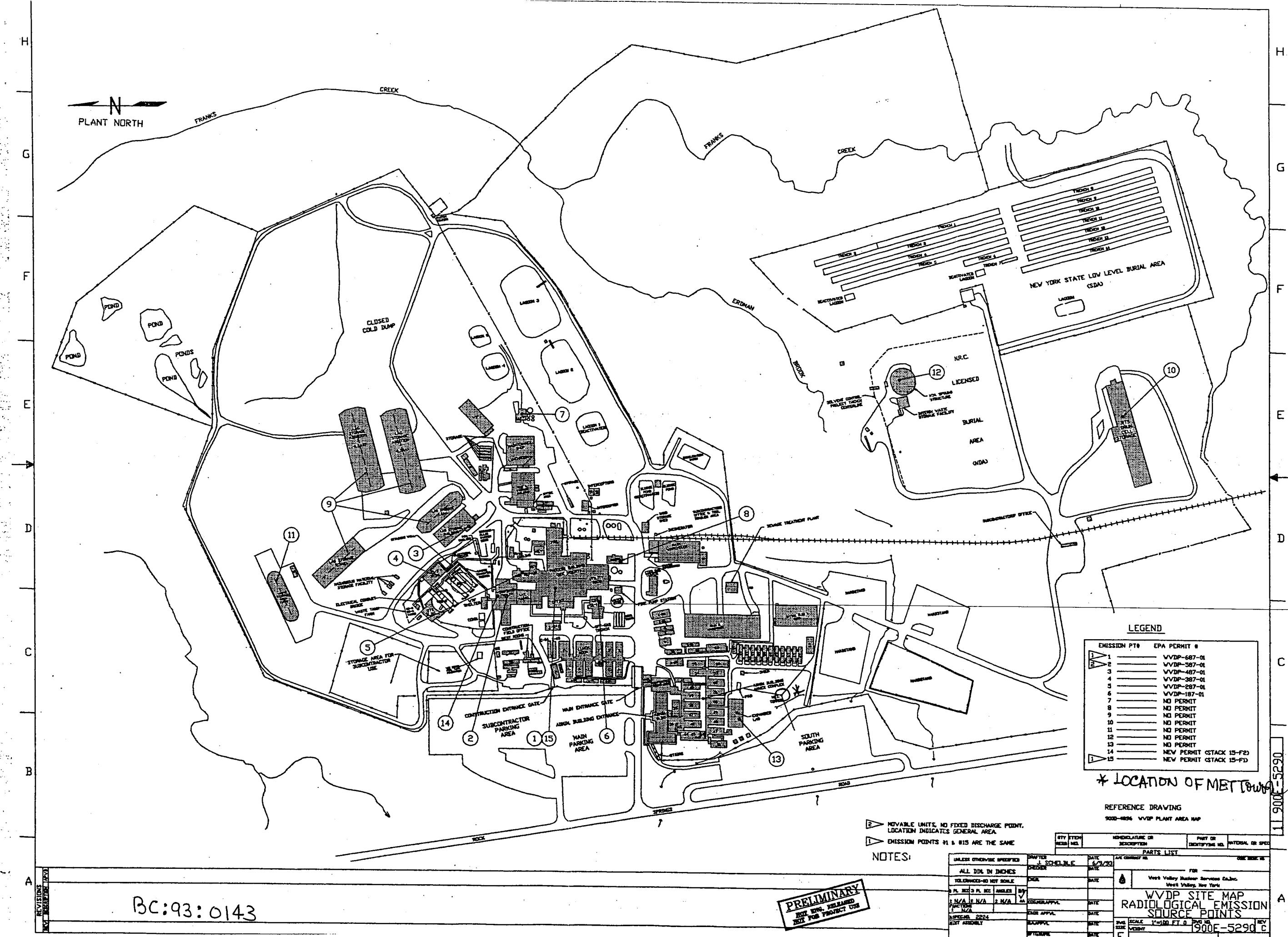
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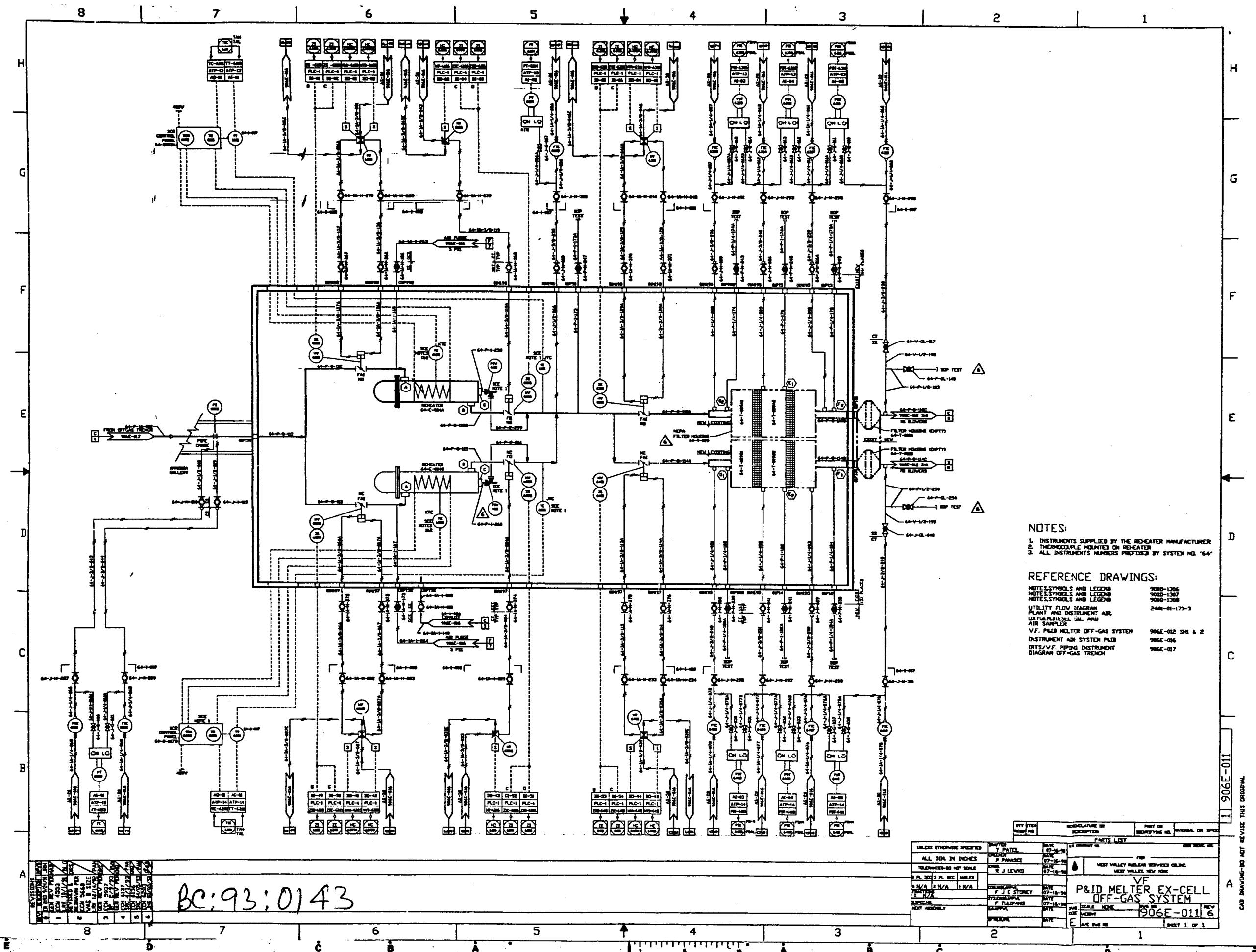
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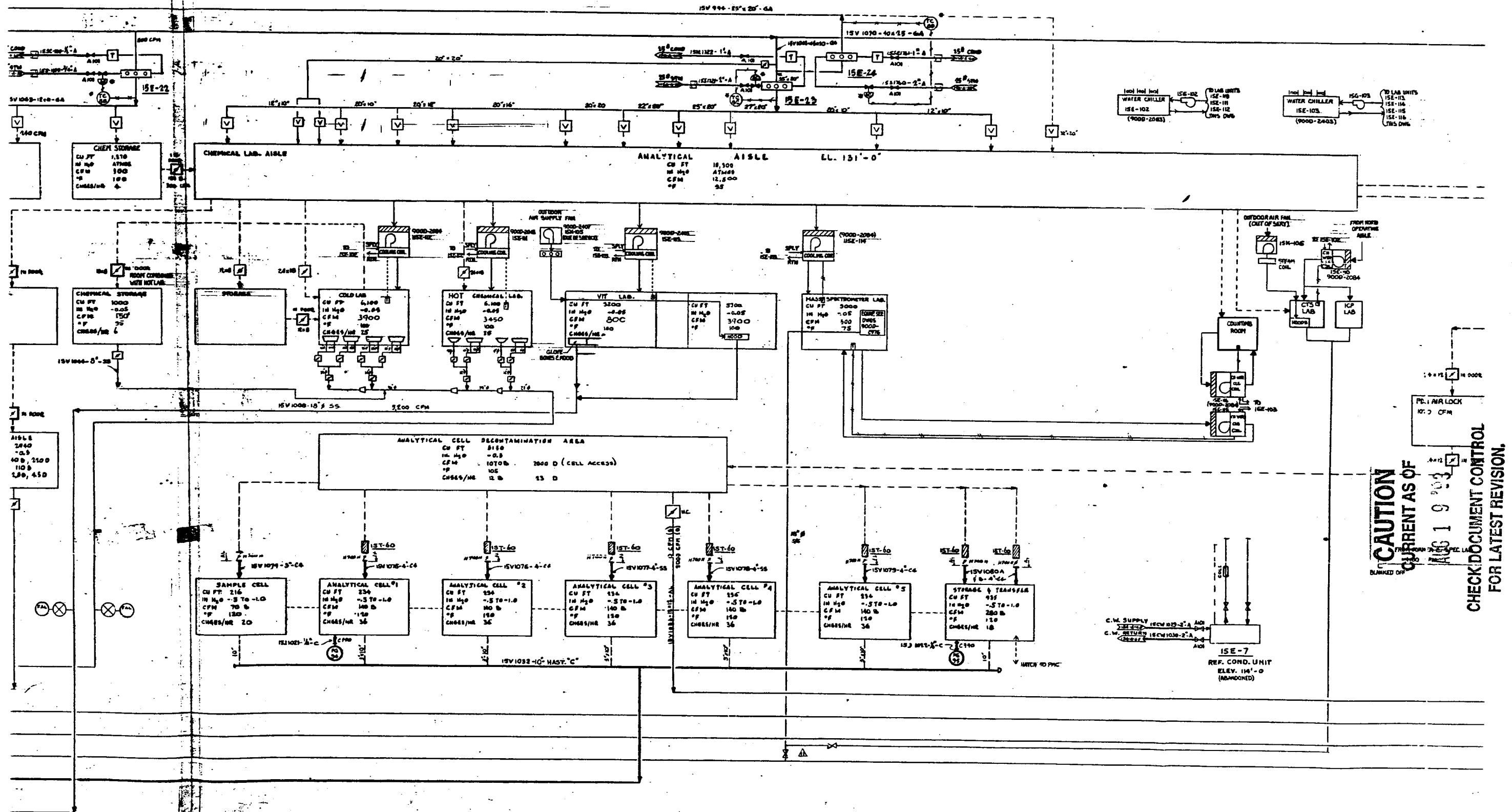




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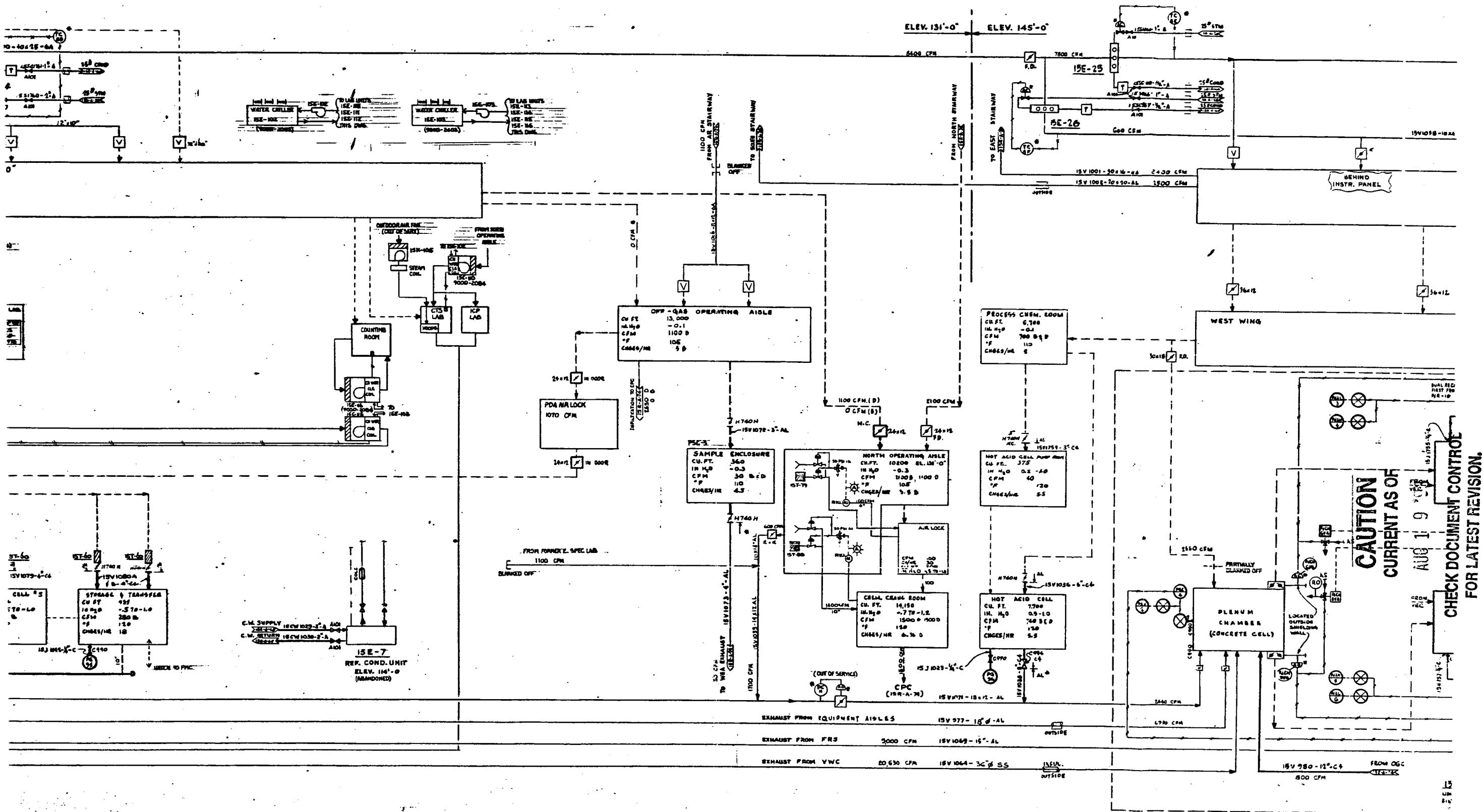
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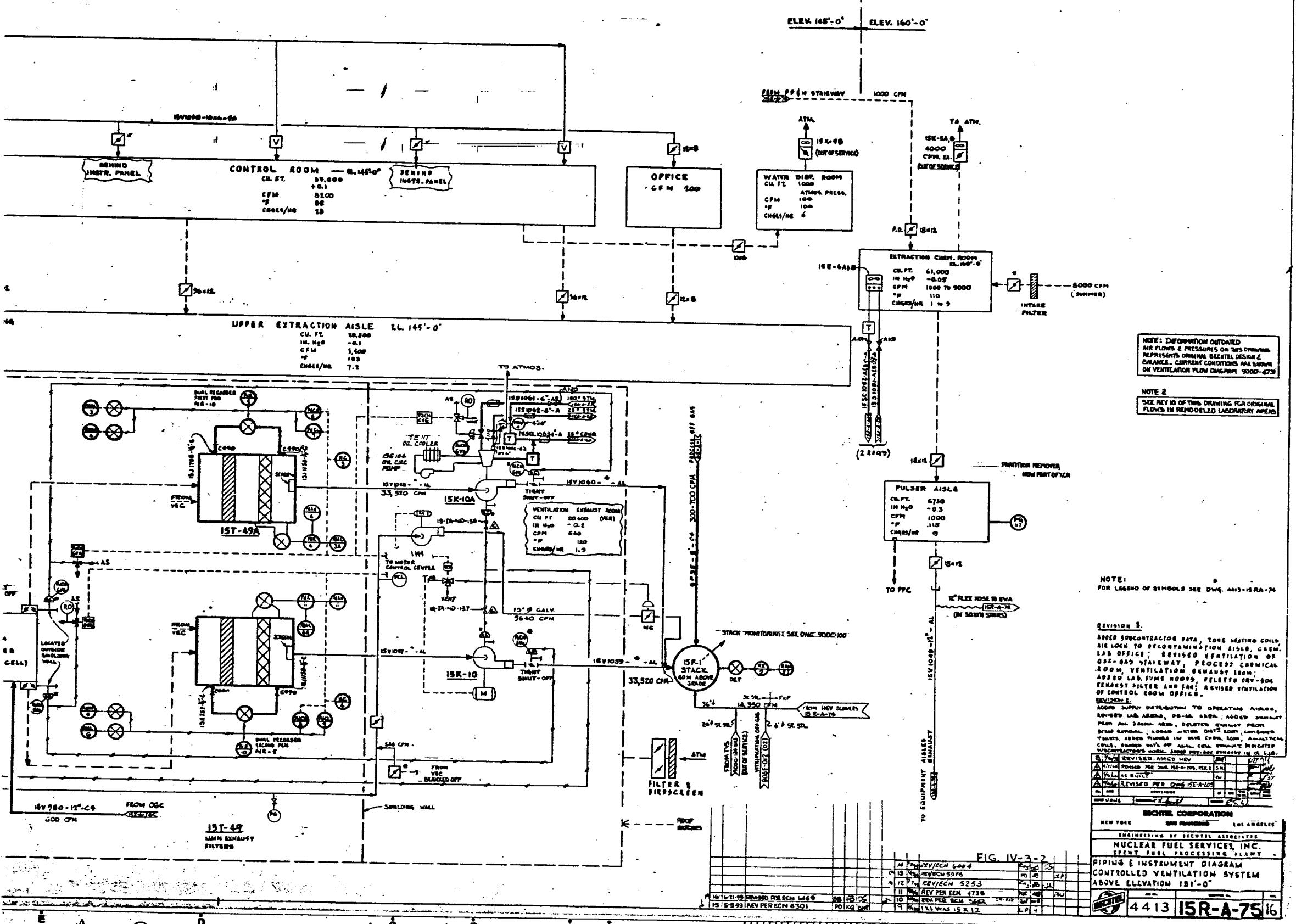
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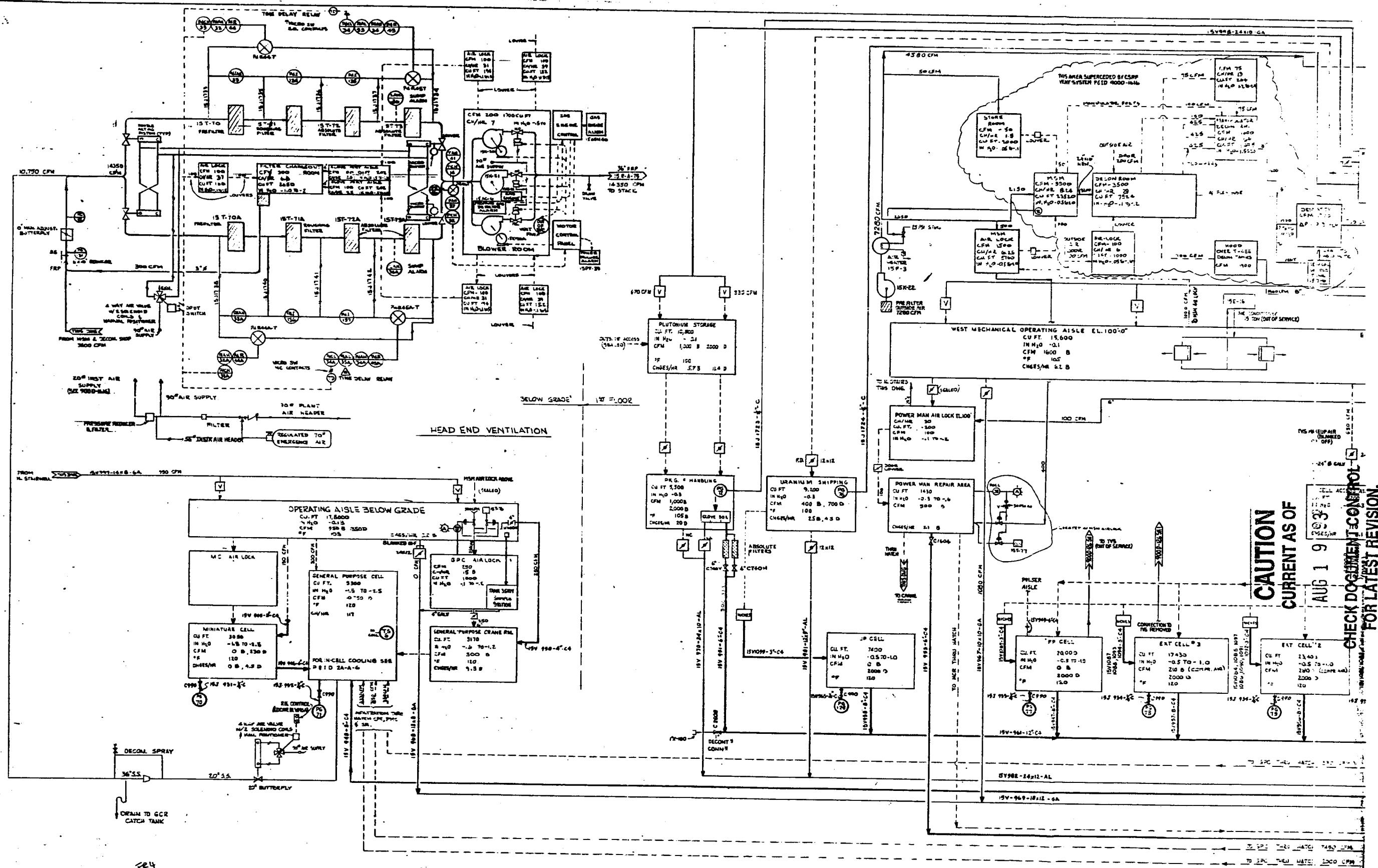
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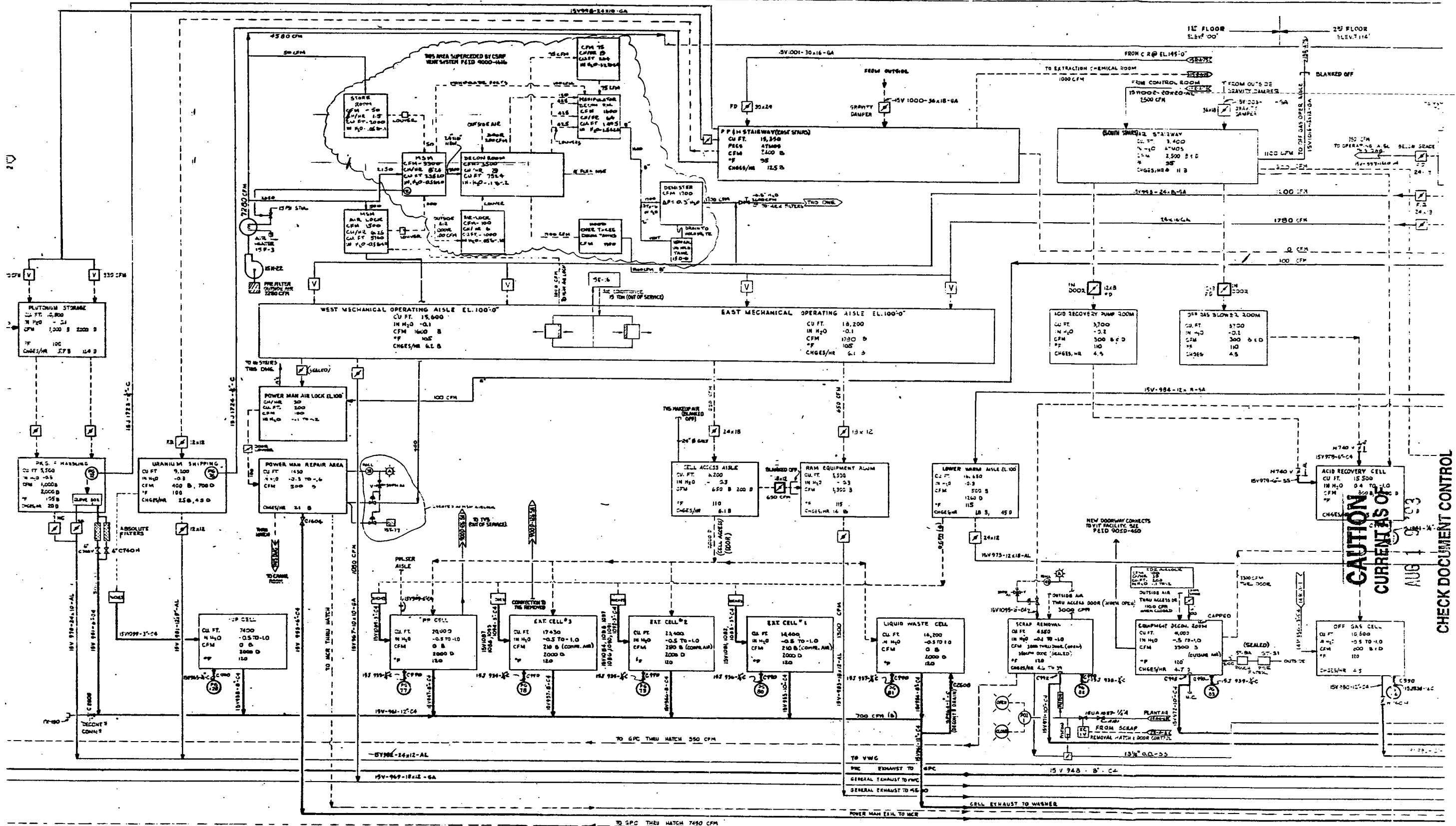
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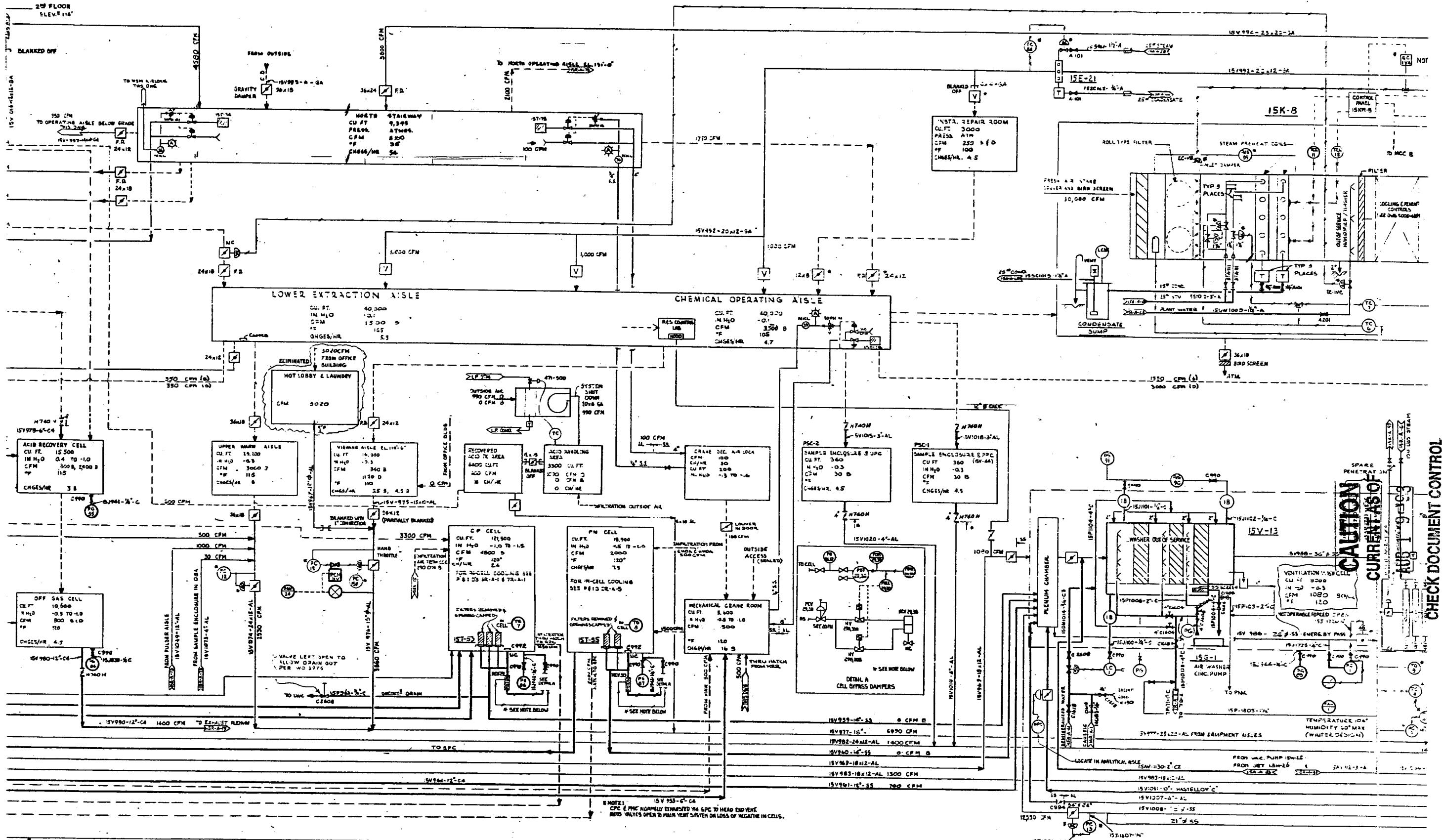
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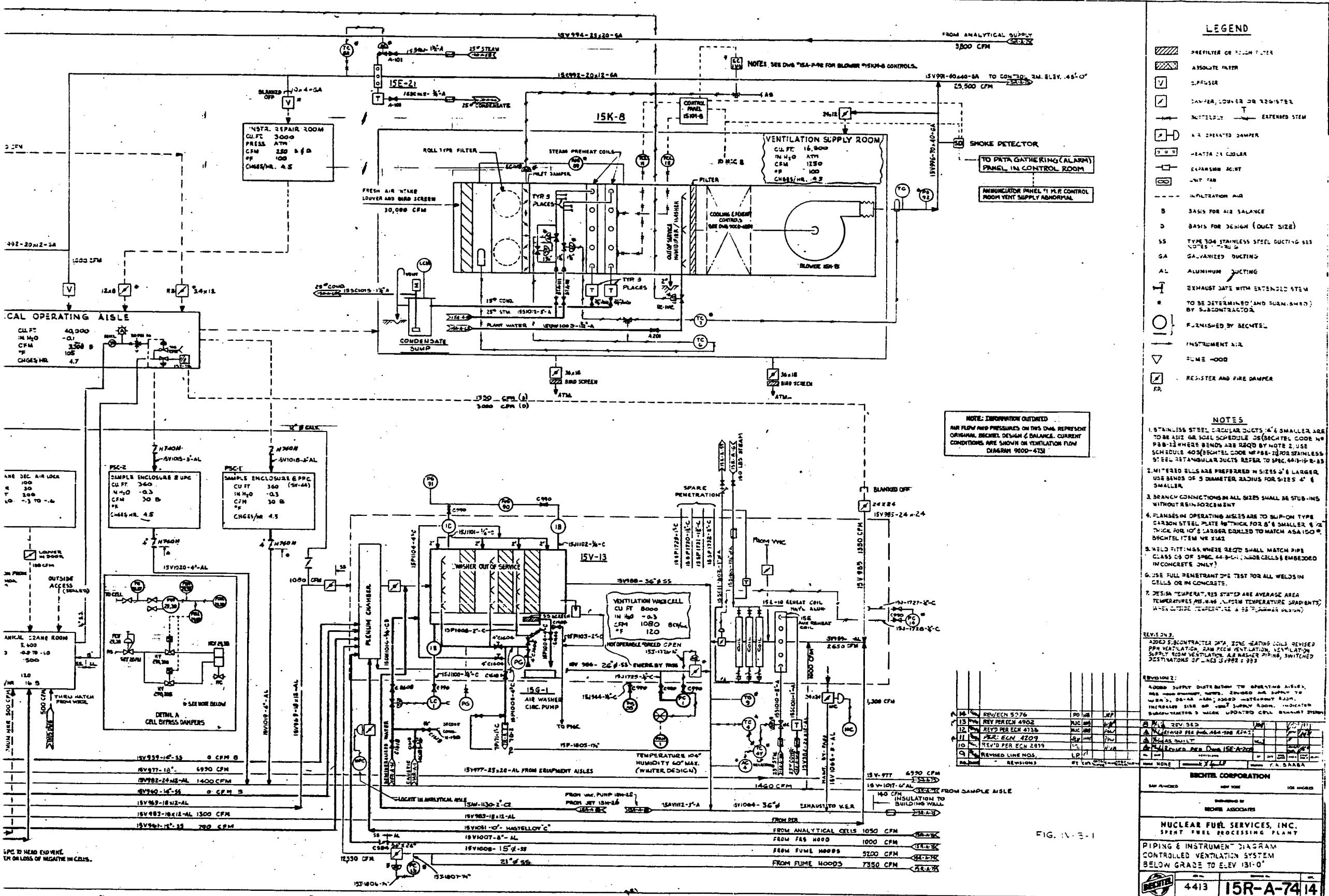
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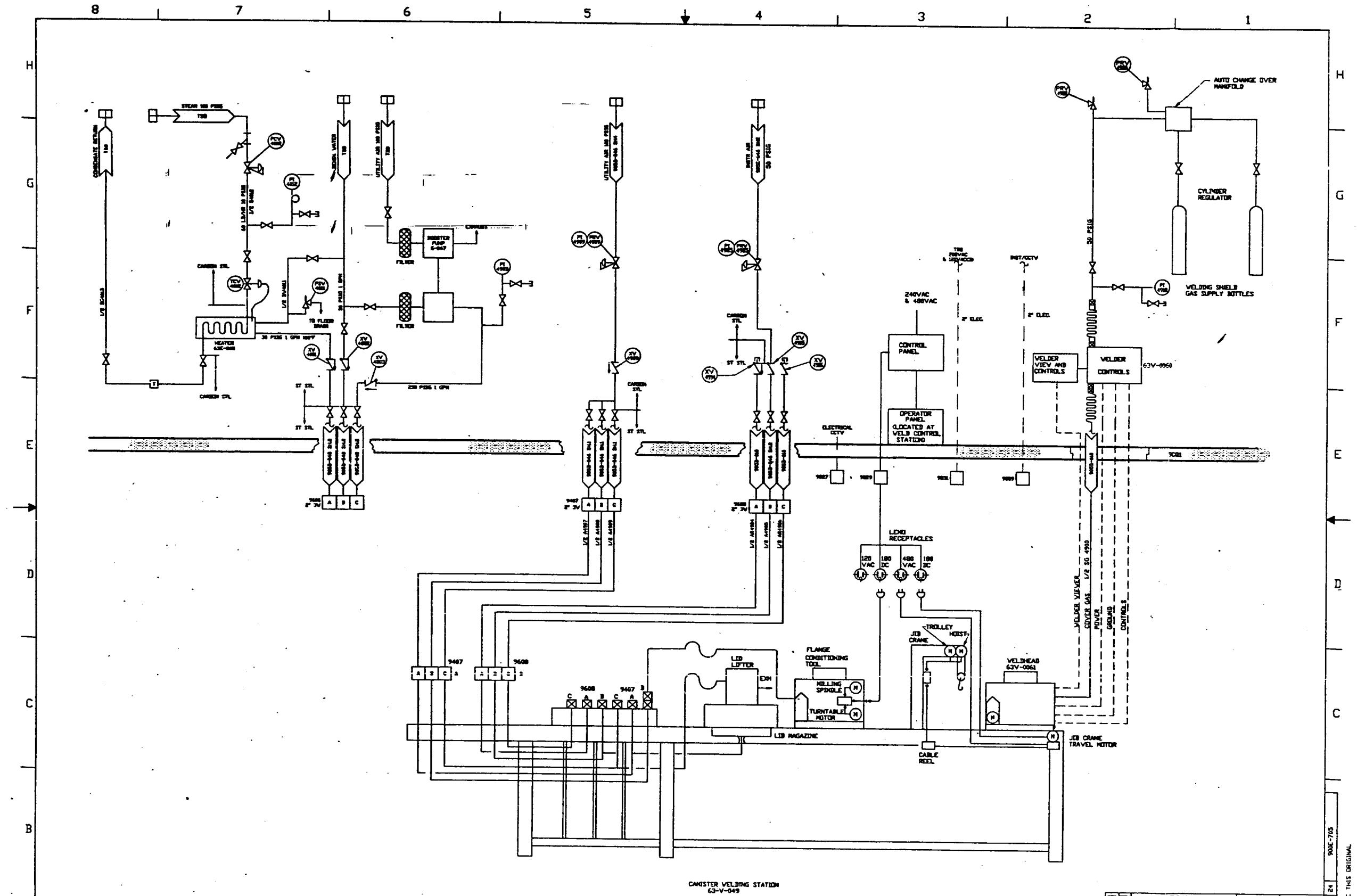


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BC 93:0143



ITEM NO.	DESCRIPTION	QUANTITY	REV.
1	WELDING SHELL	1	A
2	STEAM & AIR PIPES	1	
3	STEAM & AIR PIPES	1	
4	STEAM & AIR PIPES	1	
5	STEAM & AIR PIPES	1	
6	STEAM & AIR PIPES	1	
7	STEAM & AIR PIPES	1	
8	STEAM & AIR PIPES	1	

BC : 93 : 0143

CANISTER WELDING STATION
63-V-049

UNLESS OTHERWISE SPECIFIED	DRAFTED BY	CHECKED BY	DATE	PARTS LIST	
				ITEM NO.	DESCRIPTION
PRINT DRAWING DO NOT REVISE THIS ORIGINAL					
		P. BURN	9/2/78		FOR
		P. BURN	9/2/78		Vent Valley Nuclear Services Facility
		P. BURN	9/2/78		Vent Valley, New York
		P. BURN	9/2/78		CANISTER WELDING STATION 63-V-049
		P. BURN	9/2/78		PIPING & INSTRUMENT DIAGRAM
		J. HORTON	9/2/78		PAGE 24 OF
		J. HORTON	9/2/78		900E-705
		J. HORTON	9/2/78	E	

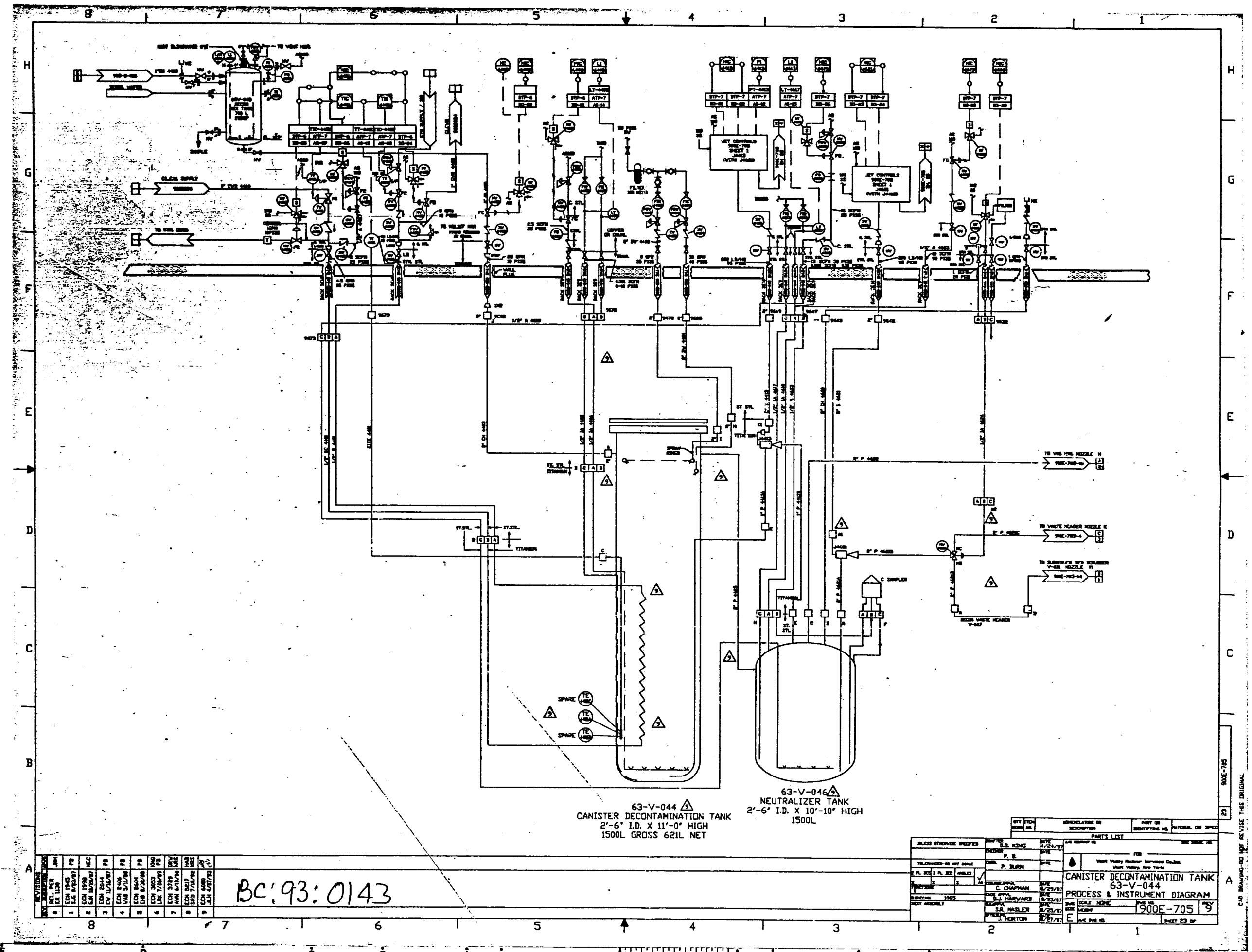
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AUG 19 '83

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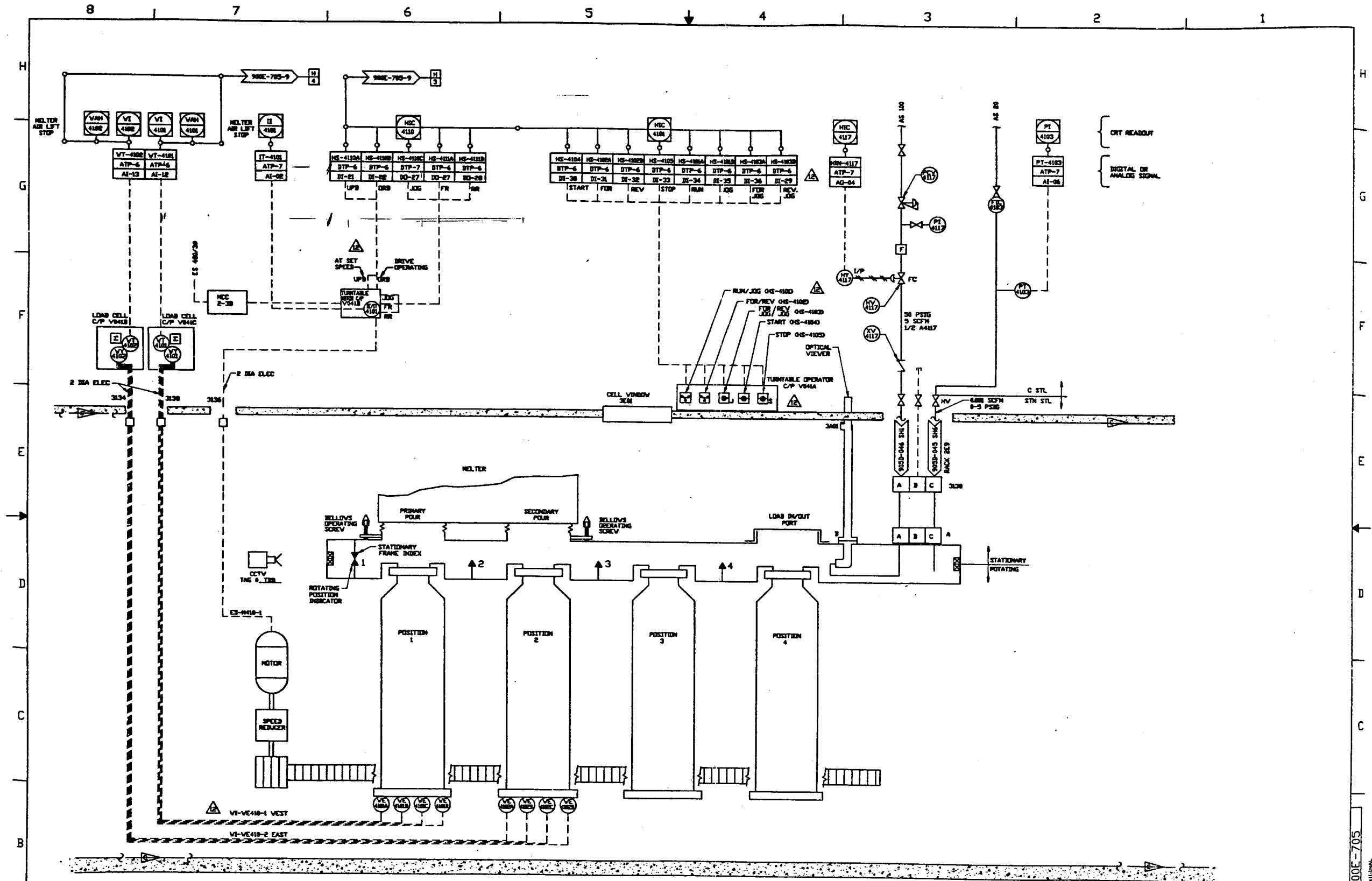
AUG 19 1993

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CAUTION
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AUG 19 '03

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REVISIONS	
1	1000E-705
2	1000E-705
3	1000E-705

Bc:93:0143

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				ITEM NO.	DESCRIPTION
ALL DIM IN INCHES	ALL REPRINTED	DATE 9/22/93	DATE SHEET 08		
TOLERANCES DO NOT SCALE	R. RAMA	9/22/93			
2 PL. 302 3 PL. 304	C. CHAPMAN	9/22/93			
N/A	H. HEARY	9/22/93			
E/N/A	C. COOKRUPPA	9/22/93			
E/N/A	A. CHAPMAN	9/22/93			
E/N/A	D. SPYL	9/22/93			
SPECIFICATIONS					
NET ASSEMBLY					
MANUFACTURER	J. BRIGGS	DATE 9/22/93	DATE 9/22/93		
OFFICIAL	I. HORTON	9/24/93	E. AVE 248 NO.		

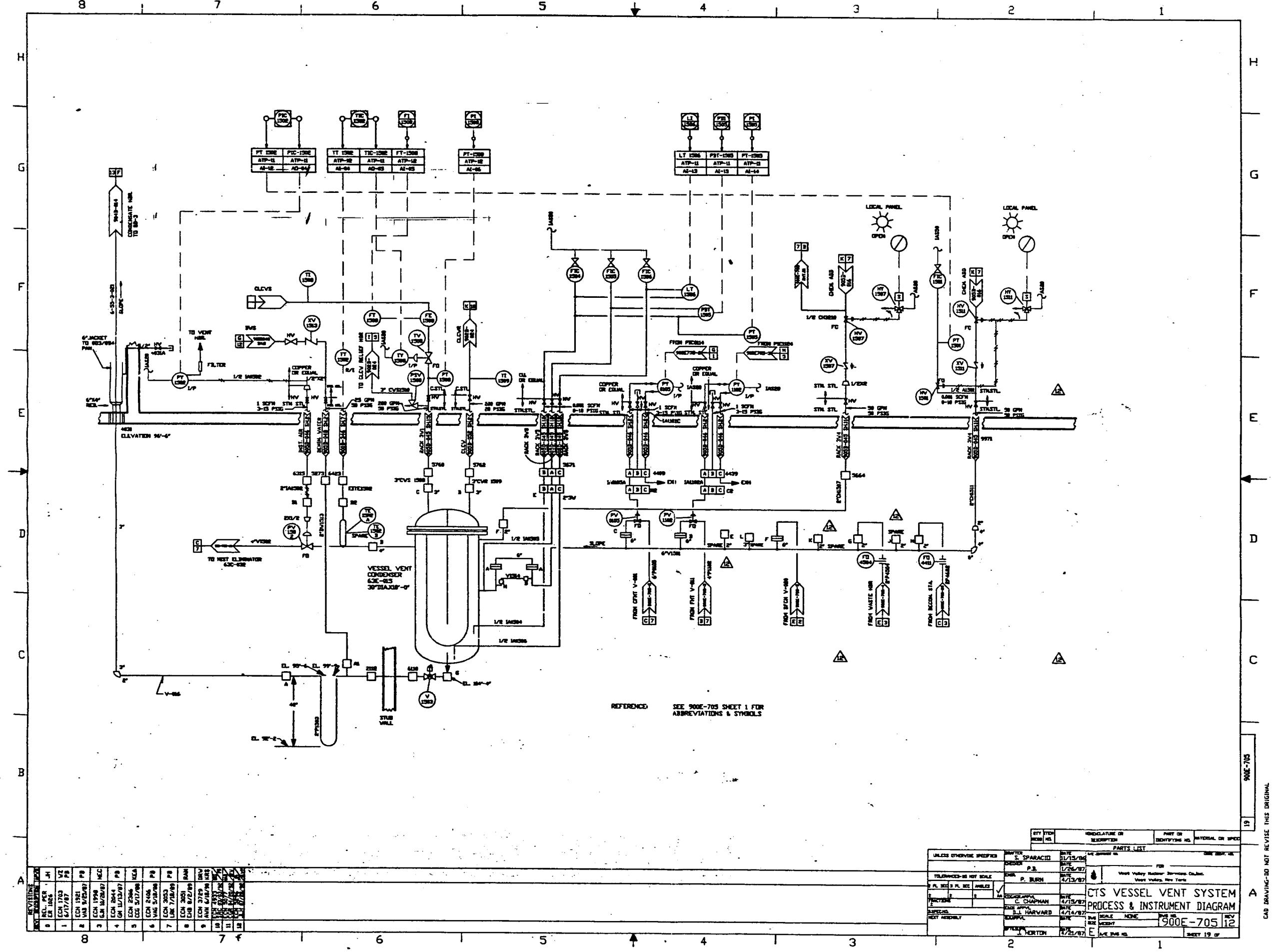
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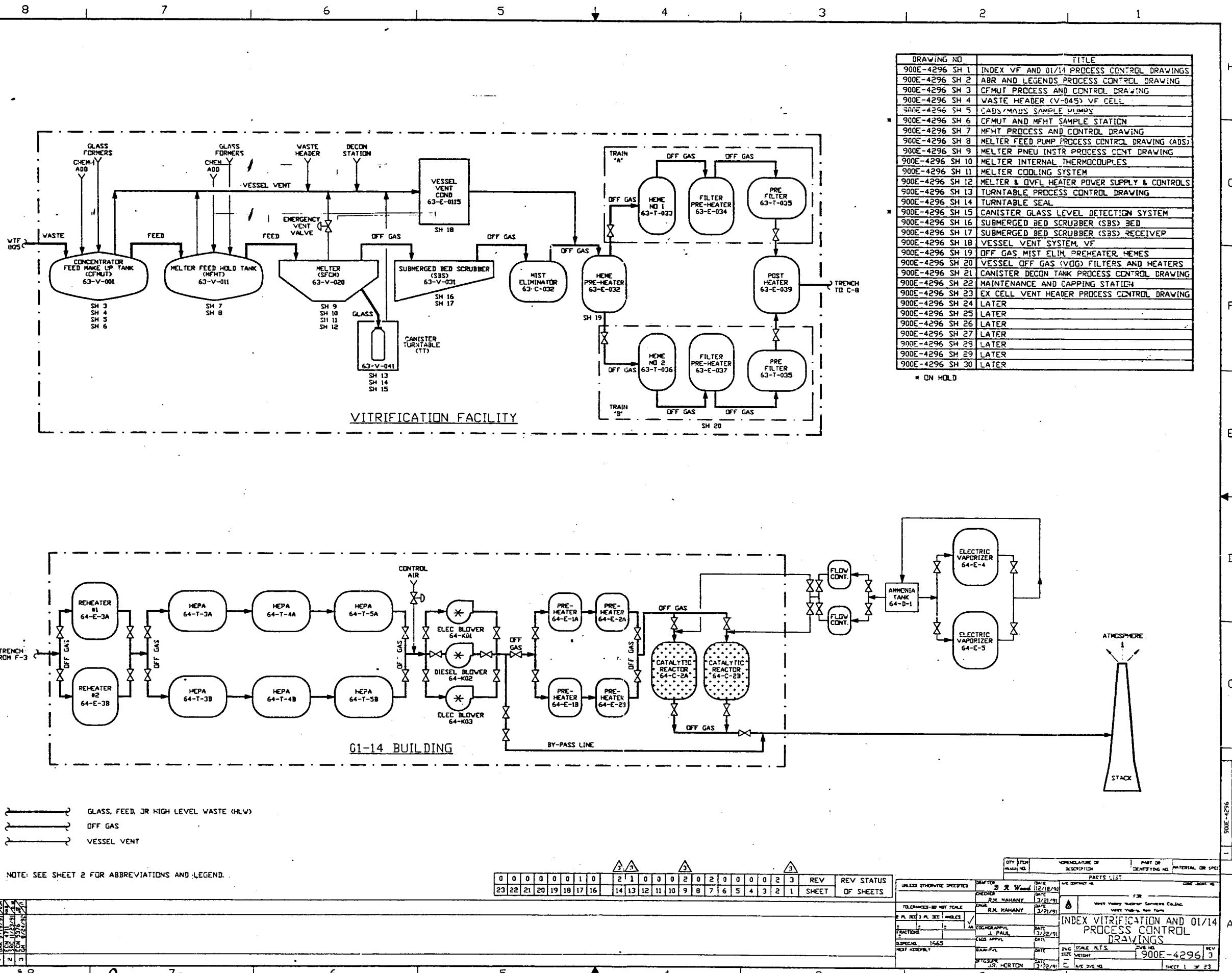
PROCESS & INSTRUMENT DIAGRAM	
ITEM NO. 1000E-705	REV 12

CAUTION
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AUG 19 '03
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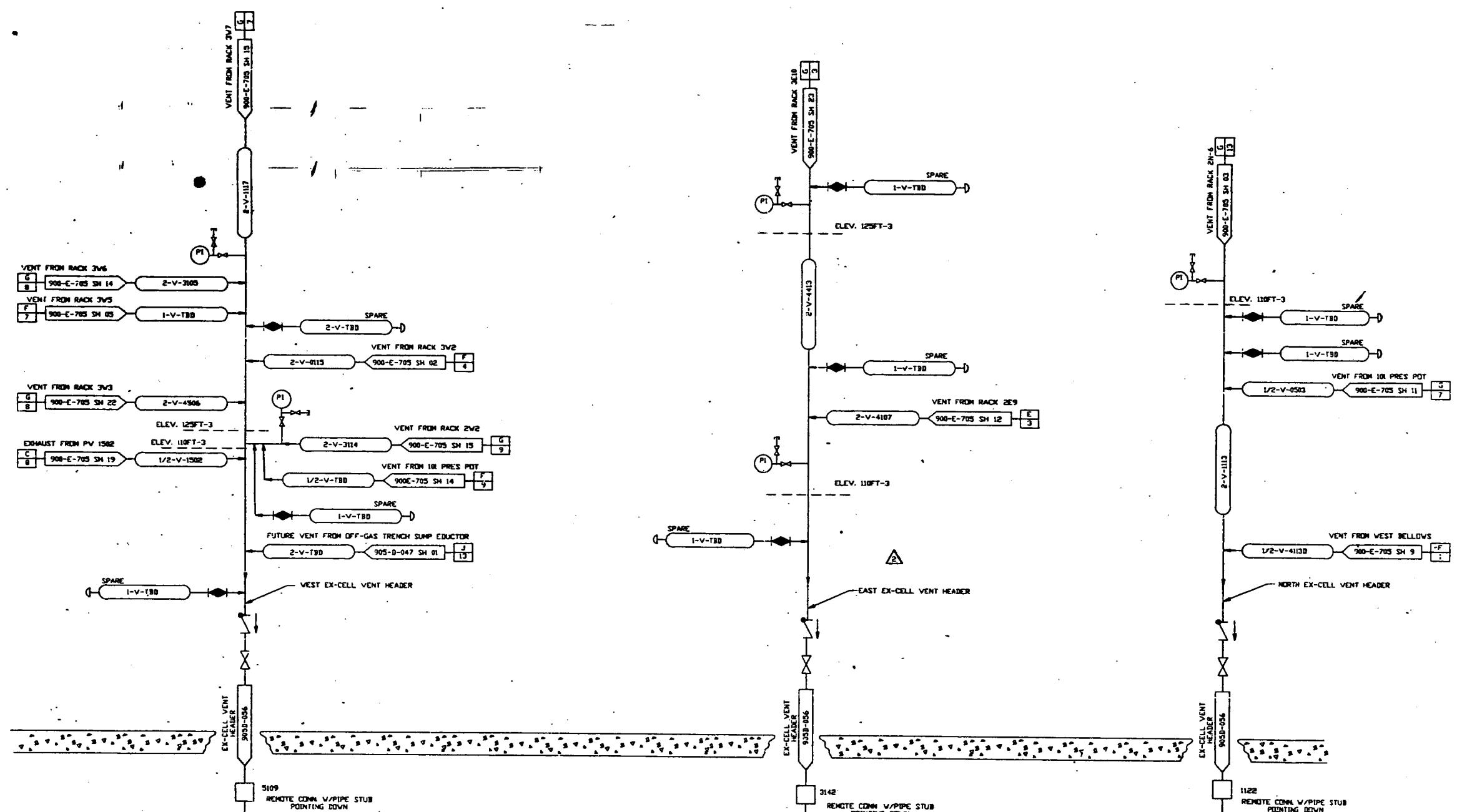


CAUTION
CURRENT AS OF

AUG 19 1991
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CAUTION
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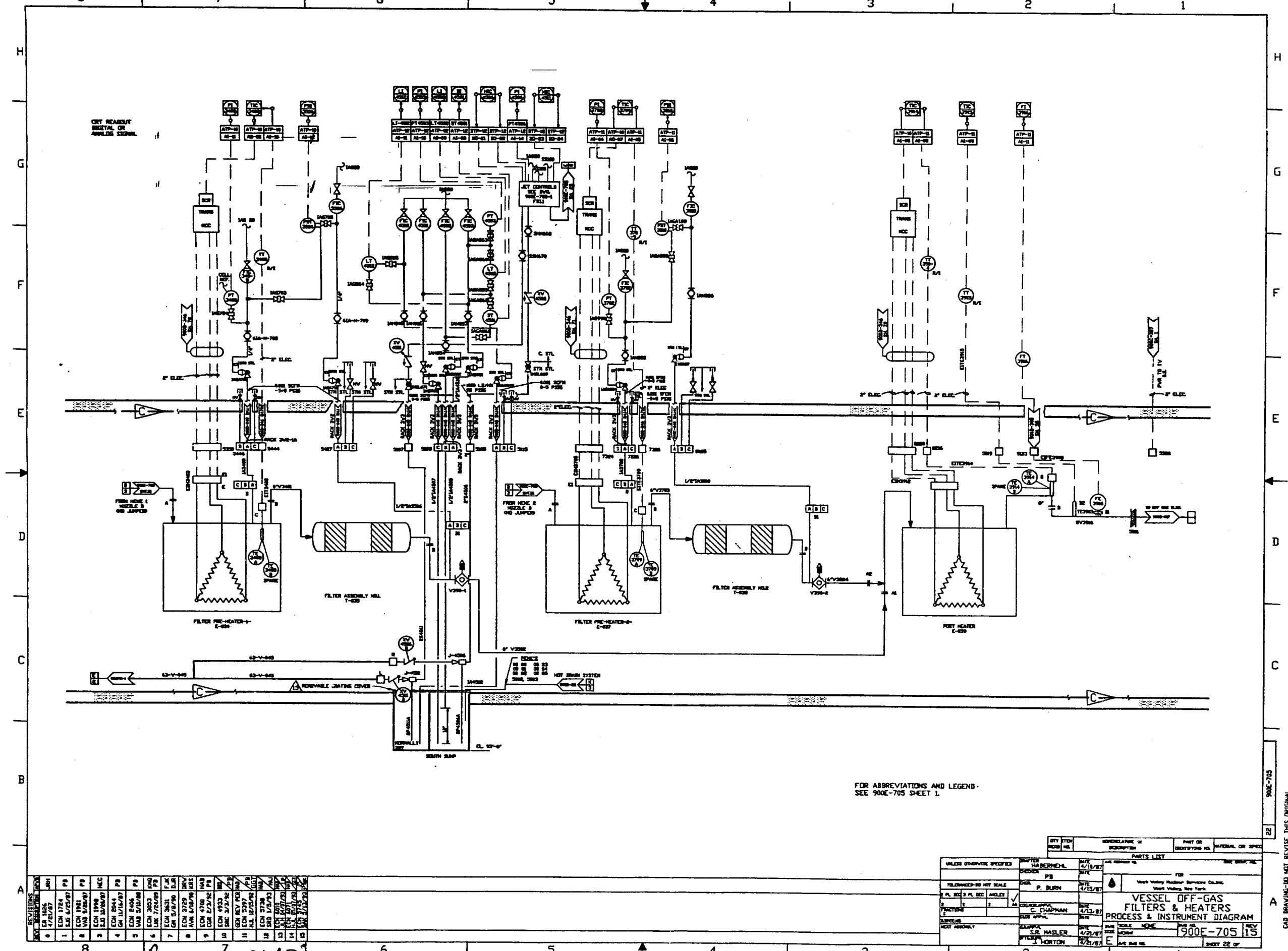
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CHECK DOCUMENT CONTROL
FOR LATEST REVISION.



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PARTS LIST			
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REV. 1000	CHECKED D.J.Ricketson	DATE 1/7/93	FOR West Valley Nuclear Services Co Inc.
REV. 1000	APPROVED D.J.Ricketson	DATE 1/7/93	West Valley, New York
REV. 1000	SUPERVISOR V. DeCicco	DATE 1/7/93	EX-CELL VENT HEADER
REV. 1000	DESIGNER M. Conda for B&W	DATE 10/19/92	PIPEING & INSTRUMENTATION
REV. 1000	REVIEWER Edward Kay	DATE 1/7/93	DIAGRAM
REV. 1000	SPONSOR G.W. Norton	DATE 1/7/93	
REV. 1000	SIZE NONE	REV. NO. 900-E-705	
REV. 1000	WEIGHT	REV. 2	
REV. 1000	DATE 1/7/93	EX-CELL VENT HEADER	

REVISIONS
REV. 1000
REV. 1000
REV. 1000
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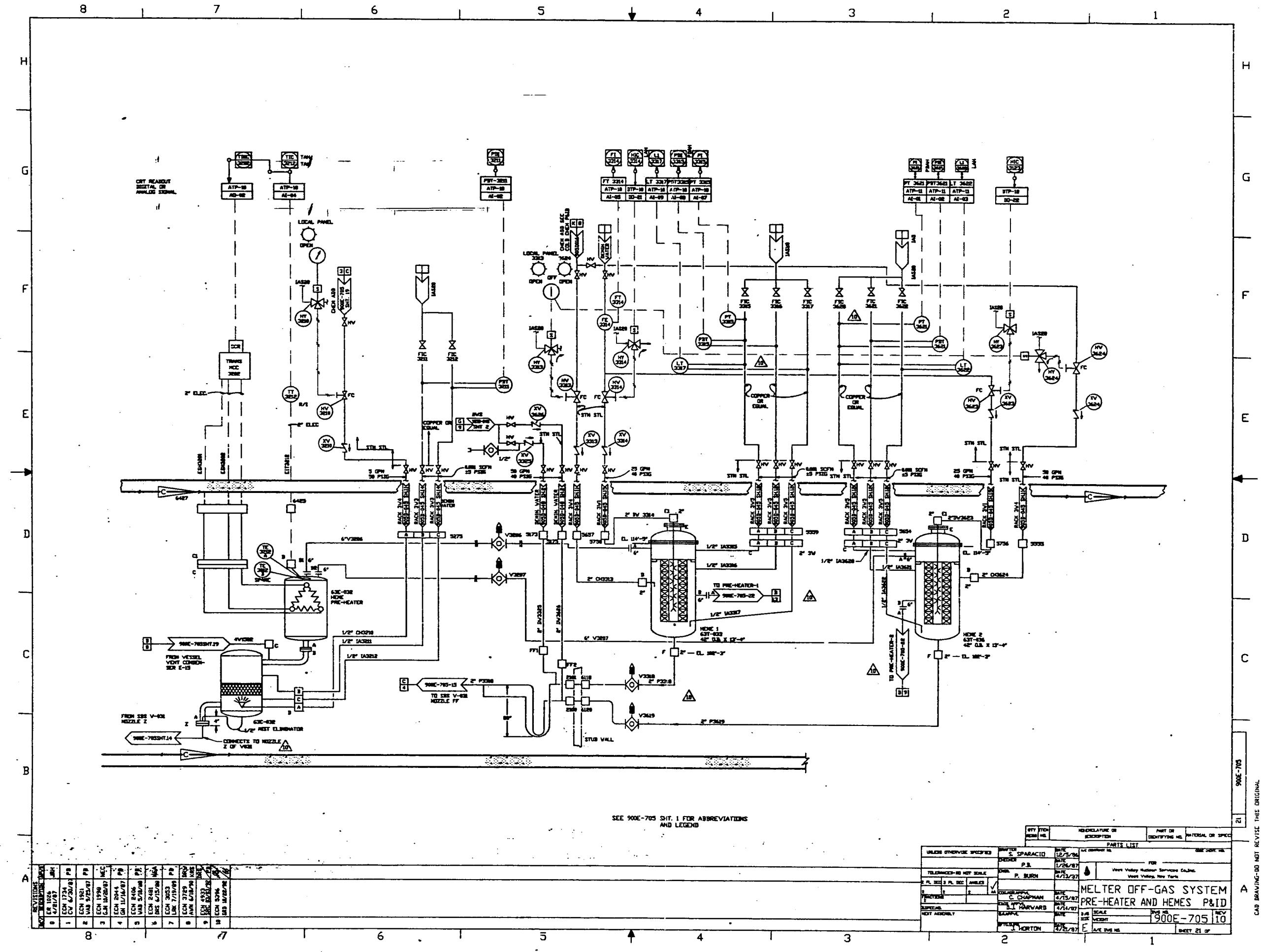
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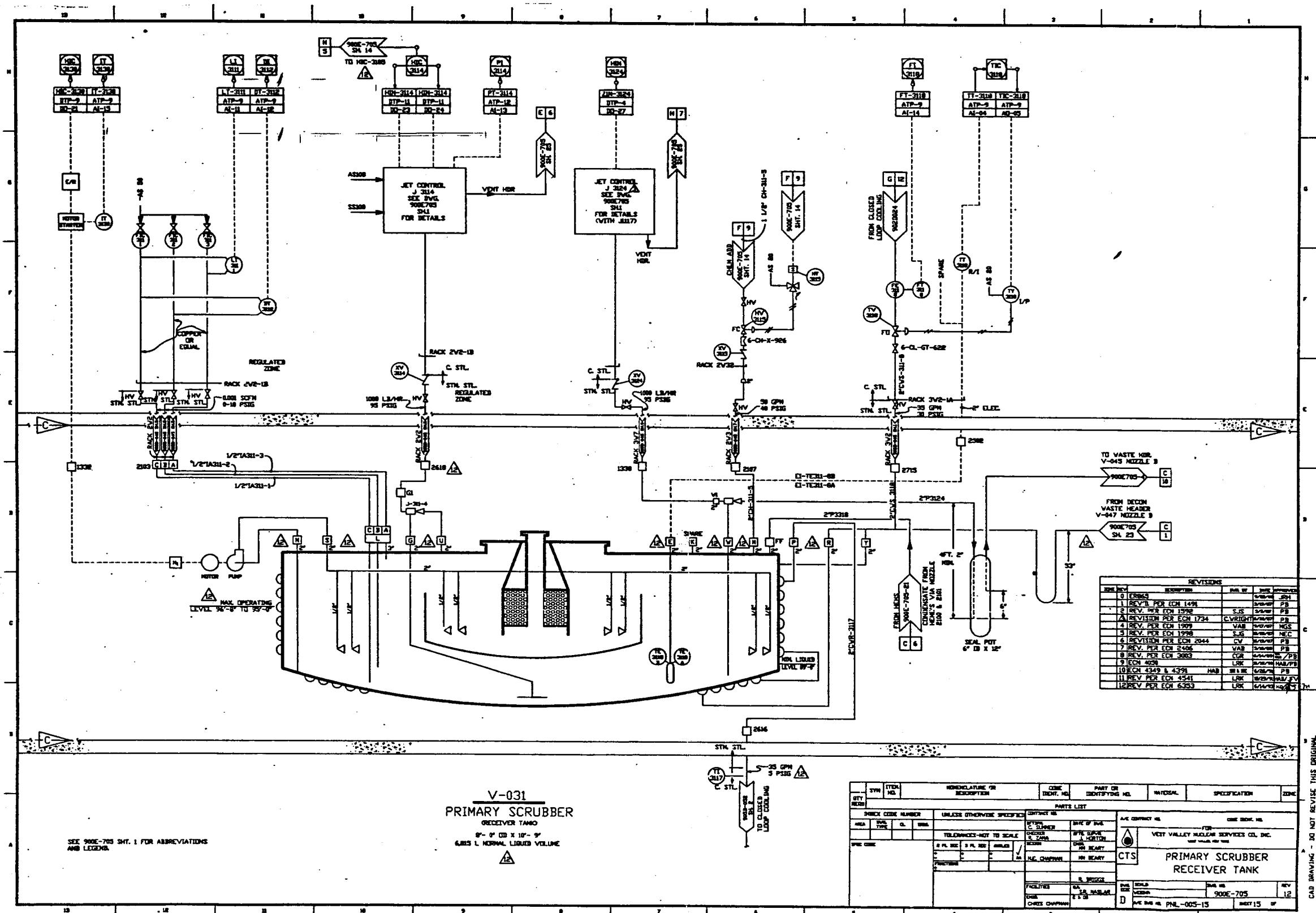
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SEE 900E-705 SHT. 1 FOR ANNOTATIONS
AND LEGEND

V-031

PRIMARY SCRUBBER

RECEIVER TANK

9'-0" OD X 10'-0"

4,685 L NORMAL LIQUID VOLUME

BC:93:0143

ATTACHMENT C

Request For Approval To Modify Permit Source of Atmospheric Emissions of Radionuclides

I. Name and Address of Applicant

U.S. Department of Energy
West Valley Demonstration Project
10282 Rock Springs Rd.
West Valley, New York 14171-9799

Operating Contractor

West Valley Nuclear Services Co., LLC.
10282 Rock Springs Rd.
West Valley, New York 14171-9799

II. Name and Location of the Source

Name: **Main Plant Stack/ Melter Off-gas**
Location: West Valley Demonstration Project
10282 Rock Springs Road
West Valley, New York 14171

Latitude: 42 degrees 27 minutes N
Longitude: 78 degrees 39 minutes W

Date of Interim Approval, Liquid Waste Treatment System (LWTS): December 30, 1987
Date of Final Approval, Liquid Waste Treatment System (LWTS): May 5, 1989
Date of Interim Approval, Vitrification System: May 8, 1995
Date of Radiological Start up, Vitrification System: June 24, 1996
Date of Final Approval, Vitrification System: February 2, 1997

III. Release Point Information

Emission Point ID	015F1
Inside Dimensions (inches)	53
Ground Elevation (Ft. MSL)	1415
Exit Temperature (degrees F)	100
Height Above Structures (ft)	160
Exit Velocity (ft/sec)	60
Stack Height (ft)	208
Exit Flow Rate (ACFM)	50,000

IV. Overview of Operation

The process building main stack is an existing release point for ventilation and off-gas systems associated with the original nuclear fuel reprocessing plant. The following ventilation or off-gas streams discharge through this release point: The high level Waste Tank Farm off-gas system (WTF); the Head End Cell Ventilation system (HEV); the Vessel Off-gas System (VOG), which includes the Liquid Waste Treatment System (LWTS); the main plant ventilation system or the Ventilation Exhaust Cell (VEC); the Fuel Receiving and Storage Area Ventilation System (FRS); and the High Level Waste Vitrification Off-Gas Treatment System.

The high level Waste Tank Farm (WTF) off-gas system draws off-gas from the high level waste tanks 8D-1, 8D-2, 8D-3 and 8D-4. Off-gas from the high-level waste storage tanks passes through a knockout drum to remove entrained liquid (off-gas from the acid waste storage tanks first passes through a caustic scrubber). These off-gases then pass through a fiberglass roughing filter, a HEPA filter, and a blower. The filters and blowers are paralleled with identical standby units. This system contributes approximately 120 cfm to the main stack flow.

The Head End Vent system (HEV) ventilates the process-mechanical cell, general purpose cell, chemical process cell and the Master Slave Manipulator repair shop (MSM) and complements the main plant ventilation system. The HEV includes provisions for maintaining the proper direction of air flow and air balance. Together the two systems increase the circulation of air and increase pressure gradients within the head end cells, crane rooms, and associated air locks and the MSM repair shop. The HEV diverts the bulk of the radioactive particulate load from the main ventilation system and provides an additional 14,000 cfm capacity to the plant ventilation system. The HEV provides double HEPA filtration for the areas ventilated by this system.

The Vessel Off-Gas system (VOG) provides between 500 and 650 cfm to the main stack from vessels and tanks inside the plant. The various process vessels and equipment pieces are connected to a vent header and ducted through a scrubber, a filter, and an exhauster. The filter and exhauster are in duplicate to permit uninterrupted flow during filter change out. The exhaust connects to the stack after passage through an additional HEPA filter. The Liquid Waste Treatment System (LWTS) is located in the process building. Off-gas from LWTS process vessels is vented to the VOG. The primary treatment component in the LWTS is a high efficiency evaporator which receives liquid waste streams that have been pretreated with either filtration or ion exchange. The objective of this system is to decontaminate the waste streams sufficiently to allow the remaining water to be discharged from the main stack as water vapor.

The main plant ventilation system, or the Ventilation Exhaust Cell (VEC), provides approximately 34,000 cfm of ventilation air to the process building from areas containing little or no contamination to more contaminated areas. The air is passed through a double train of prefilters (roughing filters) and (HEPA) filters.

The Fuel Receiving and Storage (FRS) ventilation system provides ventilation for the fuel storage pool and cask decontamination area and is equipped with an air recirculation system

which reduces the need to exhaust large volumes of air from this area. However, approximately 1,000 cfm is exhausted from the cask decontamination area through an air washer (wet scrubber) to the main stack. An additional 4000 CFM passes to the Main Stack from the FRS South Aisle.

The high-level waste vitrification off-gas treatment system is vented to the main stack. This system treats off-gas from the Slurry-Fed Ceramic Melter (SFCM) and other vitrification process vessels. Initial treatment is done in the vitrification cell when the off-gas is routed through a Submerged Bed Scrubber (SBS), High Efficiency Mist Eliminators (HEME), and HEPA filters. The off-gas is then routed to the 01-14 Building through a Nitrogen Oxide Abatement System. From there, the off-gas is passed through a roughing filter and two HEPA filters prior to discharge from the main stack. This stream contributes approximately 1,300 cfm to the stack.

I. Stack Source Term Calculation Assumptions

The total source term for the realistic potential emissions source terms for the main plant stack is shown in Table 1.

Per 40 CFR 61 Subpart H and as described in section 3.0, the maximum abated emissions source term only needs to take into account the remainder of the activity in 8D-2, the inventories of the GPC and PMC, and the fuel stored in the FRS. Each contributor was assigned an appropriate physical state factor and a decontamination factor based on 40 CFR 61 Appendix D.

A. Waste Tank Farm (WTF)

Potential emissions from the waste tank farm are assumed to originate from the water/solids mixture at the bottom of tank 8D-2. All high-level wastes are assumed to be in 8D-2 (i.e., zeolite and liquid wastes in 8D-1 are completely transferred). The radionuclide distribution is shown in Table 2.

The primary mechanism for mass transfer of radionuclides from the liquid phase to the air in the tank is assumed to be aerodynamic entrainment. The bounding atmospheric release rate of 1 E-10 hr⁻¹ was obtained from DOE-HDBK-3010-94, section 3.2.4.2, for "suspension of liquids from shallow pools of concentrated heavy metal solutions on stainless steel." No estimate for tritium emissions is provided for the WTF. Emissions of tritium are assumed to be dominated by operation of the LWTS evaporator. All other radionuclides remaining in 8D-2 are assumed to be soluble.

The realistic potential emissions source term was estimated by calculating the suspension rate in Ci/hr using the bounding atmospheric release rate and then determining the total curies released per year. The efficiency of HEPA filters installed in the WTF ventilation system is assumed to be 99.95% (DF=2000). The HEPA filter is assumed to have no removal efficiency for gaseous radionuclides (H-3, C-14, and I-129).

B. Head End Ventilation (HEV)

The general purpose cell (GPC) and the process mechanical cell (PMC) are assumed to contain all of the radionuclide inventory ventilated by the HEV. The inventories of the

GPC and the PMC were obtained from "Estimation of Activity in the Former Nuclear Fuel Services Reprocessing Plant" (Wolniewicz March 1993) and are shown in Table 3. The fraction of the inventory that is assumed to be dispersed into the air during future decontamination and decommissioning (D&D) is 0.001. This is the emission factor for particulate radioactivity required by Appendix D of 40 CFR 61 for determining whether a permit is required. No estimates are provided for emissions of tritium and I-129 from the HEV. It is assumed that there is no significant accumulation of these radionuclides in the head end cells because they are water soluble and are likely to have either remained in liquid waste streams or evolved as gases or vapors during NFS fuel processing.

The realistic potential emission source term and unabated potential source term were estimated by adding the inventories of the PMC and GPC and multiplying the sum by the emission factor. The pre-filter efficiency is assumed to be 90% (DF=10). Per PSR-3, the roughing filter + HEPA filter + HEPA filter trains in the HEV are assumed to have collection efficiencies of 99.95% (DF=2000). These trains are assumed to have no removal efficiency for C-14.

C. Vessel Off-Gas (VOG)

The vessel off-gas potential emissions are assumed to be dominated by operation of the liquid waste treatment system (LWTS) evaporator. Soluble species of Sr, Cs, and Pu isotopes in the 8D-1 aqueous phase, a primary waste stream for the LWTS evaporator, are reported in WVNS-CAL-266. These concentrations are used in lieu of modified HLW scaling factors. The distribution of other radionuclides is based on a modified HLW distribution in 8D-2, as described below.

The concentration of H-3, C-14, I-129, and Eu-154 was determined by multiplying the radionuclide's modified HLW distribution by the Cs-137 concentration and its solubility as reported in "Fissile Material Accumulation" (Mahoney April 2-3, 1991).

The concentrations of Am-241, Am-243, Cm-243, and Cm-244 (the non-plutonium alpha-emitting nuclides) were estimated by multiplying the percent contribution of each of the nuclides to the total activity of the non-plutonium alpha-emitting nuclides by the total concentration of the non-plutonium alpha-emitting radionuclides. The distributions and concentrations of all radionuclides are shown in Table 4.

The airborne release fraction (ARF) of 2E-03 for radionuclides (except H-3) from the evaporator is based on a bounding estimate provided in DOE-HDBK-3010-94, section 3.1, for liquids under thermal stress (boiling). The LWTS release rate was calculated by taking the radionuclide concentration and multiplying it by the volume of the LWTS evaporator and the number of boil-downs per year.

The realistic potential emissions source term was determined by calculating the product of the potential unabated emissions source term and the decontamination factor for the abatement system. The efficiency of the roughing filter is assumed to be 90% (DF=10). The efficiency of the HEPA filter installed in the VOG system is assumed to be 99.95% (DF=2000). The filters are assumed to have no removal efficiency for gaseous radionuclides (H-3, C-14, and I-129).

D. Main Plant Ventilation Exhaust Cell (VEC)

The measured emissions (actual annual average) from the main plant stack from 1991 through 1995 are attributed to the VEC (which is the largest contributor to volumetric air flow from the stack). In addition, there are potential emissions from A&PC analyses of HLW samples from the vitrification facility. The potential unabated emissions were initially calculated in February 1989 (West Valley Nuclear Services Co., Inc. February 20, 1989) and are used for this assessment without modification. No estimate for C-14 emissions is provided for this ventilation component since the majority of C-14 potential emissions is from the melter.

The realistic potential emissions source term was estimated by reducing the unabated source term by the decontamination factor. The efficiency of the roughing filter is assumed to be 90% (DF=10). The efficiency of the HEPA filter installed in the VEC system is assumed to be 99.95% (DF=2000). The roughing filter and the HEPA filter are assumed to have no removal efficiency for gaseous radionuclides (H-3 and I-129). See Table 5 for the radionuclide distribution.

E. Fuel Receiving and Storage (FRS)

The material at risk is assumed to be dissolved radionuclides in the fuel pool. The average weekly gross beta concentration and Cs-137 concentration in the pool is 2.7E-03 $\mu\text{Ci}/\text{mL}$. The average quarterly gross alpha concentration is 4 E-07 $\mu\text{Ci}/\text{mL}$.

All of the gross beta radioactivity is attributed to Cs-137. The gross alpha radioactivity is attributed to the alpha-emitting radionuclides for which stored fuel inventory data are provided in WVNS-SAR-012. The distribution of radionuclides in the combined BWR and PWR fuel inventory is used to derive scaling factors for alpha-emitting radionuclides.

The bounding atmospheric release rate of 4 E-07 hr^{-1} was obtained from DOE-HDBK-3010-94 for "aerodynamic entrainment and resuspension indoors, on heterogeneous surface (stainless steel, concrete), low airspeeds up to normal facility ventilation flow." It is assumed that there is no gradient of air contamination above the pool or any other type of heterogeneity of airborne contamination within the FRS. The radionuclides released from the pool surface are assumed to be instantly mixed with the entire volume of air inside the FRS.

The recirculation ventilation system removes airborne contamination before a portion of the air is directed to the main plant stack and released. For this reason, the concentration of airborne radioactivity is calculated as if there were two sources of "generation" (the pool surface and the return air from the recirculation ventilation system) and two sources of removal (the air directed to the main plant stack and the influent air to the recirculation ventilation system). A mass-balance equation was set up and solved to determine the potential unabated emissions source term. The source term distribution can be found in Table 6.

The realistic source term was estimated by applying the total decontamination factor of the air cleaning system to the unabated source term. The air cleaning system is assumed to be as follows: the recirculation ventilation system treats 8,500 SCFM and has 1 pre-filter (DF=10) and 1 HEPA (DF=2000); the VEC receives 1,000 SCFM and has 1 roughing filter (DF=10) and 1 HEPA (DF=2000); and 4,000 SCFM is directed to the main plant stack without cleaning.

F. Slurry-Fed Ceramic Melter (SFCM)

Potential emissions of radioactivity from the main plant that are attributable to the SFCM are documented in WVNS-SAR-003, Table C.8.2.1-1. The values listed are used as the realistic potential emissions source term. Refer to Table 7 for source terms.

VI. Dose Assessment

The EDE to the MEOSI was calculated using CAP88-PC modeling. The Dose Assessment Synopsis and Summary are attached.

VII. References

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Mahoney, J. April 2-3, 1991. "Fissile Material Accumulation."

Scientech, Inc. January 8, 1999. "Draft Preferred Path for Implementing the Remote Handled Waste Project."

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United States Department of Energy. December 1994. Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities, Volume 1, "Analysis of Experimental Data." DOE-HDBK-3010-94.

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- _____. June 22, 1998. "Remote Handled Waste System Functional Requirements Document." WVNS-FRD 004, Revision 2.
 - _____. December 30, 1998. "Safety Analysis Report for Low-Level Waste Processing and Support Activities." WVNS-SAR-002, Revision 6.
 - _____. March 31, 1999. "Safety Analysis Report for Fuel Receiving and Storage Facility." WVNS-SAR-012, Revision 2.
 - _____. March 15, 1996. "Building and Vessel Ventilation System Requirements." PSR-3, Revision 1.
 - _____. "WVDP Waste Form Qualification Report - Canistered Waste Form Specifications." WVDP-186, WQR-1.2, Rev. 2.
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Source Term Spreadsheet Tables

Main Plant Stack/ Melter Off-gas

Table 1 - Total Main Plant Stack Realistic Potential Emissions

Radionuclide	WTF (Table 2) [Ci/year]	HEV (Table 3) [Ci/year]	VOG (Table 4) [Ci/year]	VEC (Table 5) [Ci/year]	FRS (Table 6) [Ci/year]	SFCM (Table 7) [Ci/year]	TOTAL [Ci/year]
H-3	—	—	8.81E+00	5.37E-02	—	—	8.86E+00
C-14	1.76E-05	1.07E-04	1.79E+00	—	—	1.80E-01	1.97E+00
Sr-90	3.66E-04	2.48E-04	1.73E-09	3.43E-05	—	3.90E-04	1.04E-03
Y-90	3.66E-04	2.48E-04	1.73E-09	3.43E-05	—	3.90E-04	1.04E-03
I-129	2.76E-08	—	2.81E-03	2.41E-05	—	3.00E-02	3.28E-02
Cs-137	2.59E-04	2.70E-04	2.63E-03	5.76E-05	6.91E-03	1.90E-02	2.91E-02
Ba-137m	2.45E-04	2.55E-04	2.49E-03	5.45E-05	6.53E-03	1.80E-02	2.75E-02
Eu-154	3.89E-06	3.15E-06	3.95E-04	4.92E-07	—	—	4.02E-04
Pu-238	5.05E-07	1.48E-05	1.14E-08	1.40E-07	3.40E-07	5.30E-07	1.63E-05
Pu-239	1.04E-07	3.81E-06	2.27E-09	1.14E-07	5.38E-08	1.10E-07	4.19E-06
Pu-240	7.65E-08	2.89E-06	1.70E-09	8.86E-08	8.61E-08	8.00E-08	3.22E-06
Pu-241	3.88E-06	1.43E-04	8.48E-08	1.45E-07	—	4.10E-06	1.51E-04
Am-241	3.37E-06	4.26E-06	4.06E-07	6.59E-07	4.50E-07	3.60E-06	1.27E-05
Am-242m	1.90E-08	3.24E-08	2.29E-09	4.00E-11	—	1.90E-08	7.27E-08
Am-243	2.20E-08	1.95E-07	2.64E-09	4.55E-09	2.10E-09	2.30E-08	2.49E-07
Cm-243	1.73E-08	1.05E-09	2.08E-09	2.90E-10	—	3.90E-08	5.97E-08
Cm-244	3.81E-07	6.20E-07	4.58E-08	3.85E-08	9.09E-08	2.00E-06	3.18E-06

Table 2 - Waste Tank Farm (WTF) Realistic Potential Emissions

Radionuclide	Remaining 8D-2 [Curies]	Suspension Rate [Ci/hr]	HEPA DF	Realistic Potential Source Term [Ci/year]
H-3	8.81E+00	—	—	—
C-14	2.00E+01	2.00E-09	1	1.76E-05
Sr-90	8.35E+05	8.35E-05	2000	3.66E-04
Y-90	8.35E+05	8.35E-05	2000	3.66E-04
I-129	3.15E-02	3.15E-12	1	2.76E-08
Cs-137	5.90E+05	5.90E-05	2000	2.59E-04
Ba-137m	5.58E+05	5.58E-05	2000	2.45E-04
Eu-154	8.87E+03	8.87E-07	2000	3.89E-06
Pu-238	1.15E+03	1.15E-07	2000	5.05E-07
Pu-239	2.37E+02	2.37E-08	2000	1.04E-07
Pu-240	1.75E+02	1.75E-08	2000	7.65E-08
Pu-241	8.85E+03	8.85E-07	2000	3.88E-06
Am-241	7.69E+03	7.69E-07	2000	3.37E-06
Am-242m	4.34E+01	4.34E-09	2000	1.90E-08
Am-243	5.01E+01	5.01E-09	2000	2.20E-08
Cm-243	3.94E+01	3.94E-09	2000	1.73E-08
Cm-244	8.69E+02	8.69E-08	2000	3.81E-07

Table 3 - Head End Ventilation (HEV) Realistic Potential Emissions

Radionuclide	GPC [Curies]	PMC [Curies]	Total [Curies]	Emission Factor	Pre-Filter DF	HEPA DF	Realistic Potential Source Term [Ci/year]
H-3	—	—	—	—	—	—	—
C-14	8.23E-02	2.43E-02	1.07E-01	0.001	1	1	1.07E-04
Sr-90	3.82E+03	1.13E+03	4.95E+03	0.001	10	2000	2.48E-04
Y-90	3.82E+03	1.13E+03	4.95E+03	0.001	10	2000	2.48E-04
I-129	—	—	—	—	—	—	—
Cs-137	4.16E+03	1.23E+03	5.39E+03	0.001	10	2000	2.70E-04
Ba-137m	3.94E+03	1.16E+03	5.10E+03	0.001	10	2000	2.55E-04
Eu-154	4.86E+01	1.44E+01	6.30E+01	0.001	10	2000	3.15E-06
Pu-238	2.28E+02	6.74E+01	2.95E+02	0.001	10	2000	1.48E-05
Pu-239	5.87E+01	1.74E+01	7.61E+01	0.001	10	2000	3.81E-06
Pu-240	4.45E+01	1.32E+01	5.77E+01	0.001	10	2000	2.89E-06
Pu-241	2.20E+03	6.51E+02	2.85E+03	0.001	10	2000	1.43E-04
Am-241	6.57E+01	1.94E+01	8.51E+01	0.001	10	2000	4.26E-06
Am-242m	5.00E-01	1.48E-01	6.48E-01	0.001	10	2000	3.24E-08
Am-243	3.01E+00	8.90E-01	3.90E+00	0.001	10	2000	1.95E-07
Cm-243	1.62E-02	4.80E-03	2.10E-02	0.001	10	2000	1.05E-09
Cm-244	9.56E+00	2.83E+00	1.24E+01	0.001	10	2000	6.20E-07

Table 4 - Vessel Off-Gas (VOG) Realistic Potential Emissions

Realistic Potential Source Term [Ci/year]									
<u>Radionuclide</u>	<u>Remaining [Curies]</u>	<u>Modified HLW distribution</u>	<u>Estimated Solubility</u>	<u>Non-Pu Concentration</u>	<u>LWTS Evap. [Ci/yr]</u>	<u>Roughing DF</u>	<u>HEPA DF</u>	<u>Term [Ci/year]</u>	
				<u>Percent of alpha</u>	<u>[$\mu\text{Ci/mL}$]</u>	<u>L</u>	<u>DF</u>		
IRTS DF for Cs-137	1000	8.30E-03	$\mu\text{Ci/mL}$					8.81E+00	
8D-1 gross alpha	8.03E-03		$\mu\text{Ci/mL}$						
Non-Pu alpha	5680		$\mu\text{Ci/mL}$						
LWTS Evaporator			L						
ARF for Boiling liquids	2E-03								
Evaporator Boil-downs	100	/year							
Remaining 8D-2	<u>Modified HLW distribution</u>	<u>Estimated Solubility</u>	<u>Non-Pu Concentration</u>	<u>LWTS Evap. [Ci/yr]</u>	<u>Roughing DF</u>	<u>HEPA DF</u>			
H-3	8.81E+00	1.49E-02	1	6.90E-01	3.92E+02	1	1	8.81E+00	
C-14	2.00E+01	3.40E-02	1	1.57E+00	8.93E+02	1	1	1.79E+00	
Sr-90	8.35E+05			3.05E-05	1.73E-02	10	2000	1.73E-09	
Y-90	8.35E+05			3.05E-05	1.73E-02	10	2000	1.73E-09	
I-129	3.15E-02	5.34E-05	1	2.47E-03	1.40E+00	1	1	2.81E-03	
Cs-137	5.90E+05			4.63E+01	2.63E+04	10	2000	2.63E-03	
Ba-137m	5.58E+05			4.38E+01	2.49E+04	10	2000	2.49E-03	
Eu-154	8.87E+03	1.50E+01	0.01	6.95E+00	3.95E+03	10	2000	3.95E-04	
Pu-238	1.15E+03			2.00E-04	1.14E-01	10	2000	1.14E-08	
Pu-239	2.37E+02			4.00E-05	2.27E-02	10	2000	2.27E-09	
Pu-240	1.75E+02			3.00E-05	1.70E-02	10	2000	1.70E-09	
Pu-241	8.85E+03			1.49E-03	8.48E-01	10	2000	8.48E-08	
Am-241	7.69E+03			88.9%	7.14E-03	4.06E+00	10	2000	4.06E-07
Am-242m	4.34E+01				4.02E-05	2.29E-02	10	2000	2.29E-09
Am-243	5.01E+01				0.6%	4.65E-05	2.64E-02	10	2.64E-09
Cm-243	3.94E+01				0.5%	3.66E-05	2.08E-02	10	2.08E-09
Cm-244	8.69E+02				10.0%	8.06E-04	4.58E-01	10	4.58E-08

C - 12

Table 5 - Ventilation Exhaust Cell (VEC) Realistic Potential Emissions

Radionuclide	Measured Air Emissions, Ci						1991-95	Roughing DF	HEPA DF	A&PC vent Source Term [Ci/year]	TOTAL VEC [Ci/year]
	1996	1991	1992	1993	1994	1995					
H-3	5.87E+01	1.14E-01	5.53E-02	3.11E-02	3.21E-02	3.58E-02	5.37E-02	-	-	-	5.37E-02
C-14	1.37E+02	-	-	-	-	-	-	-	-	-	-
Sr-90	5.81E+06	1.26E-05	4.71E-06	5.11E-06	1.04E-05	7.36E-05	2.13E-05	10	2000	1.30E-05	3.43E-05
Y-90	5.81E+06	1.26E-05	4.71E-06	5.11E-06	1.04E-05	7.36E-05	2.13E-05	10	2000	1.30E-05	3.43E-05
I-129	2.10E-01	5.09E-05	6.64E-06	1.87E-05	3.37E-05	1.07E-05	2.41E-05	-	-	2.41E-05	-
Cs-137	6.29E+06	2.26E-05	1.73E-05	1.32E-05	2.07E-05	1.44E-04	4.36E-05	10	2000	1.40E-05	5.76E-05
Ba-137m	5.95E+06	2.14E-05	1.64E-05	1.25E-05	1.96E-05	1.36E-04	4.12E-05	10	2000	1.32E-05	5.45E-05
Eu-154	5.91E+04	2.13E-07	2.51E-07	1.64E-07	1.82E-07	6.50E-07	2.92E-07	10	2000	2.00E-07	4.92E-07
Pu-238	8.04E+03	1.20E-07	4.11E-08	1.09E-07	1.46E-07	2.20E-07	1.27E-07	10	2000	1.30E-08	1.40E-07
Pu-239	1.65E+03	1.05E-07	4.12E-08	9.20E-08	1.54E-07	1.60E-07	1.10E-07	10	2000	3.30E-09	1.14E-07
Pu-240	1.22E+03	7.74E-08	3.04E-08	6.80E-08	1.13E-07	1.19E-07	8.16E-08	10	2000	7.00E-09	8.86E-08
Pu-241	6.13E+04	-	-	-	-	-	-	10	2000	1.45E-07	1.45E-07
Am-241	5.35E+04	5.40E-07	1.54E-07	3.15E-07	4.66E-07	1.02E-06	4.99E-07	10	2000	1.60E-07	6.59E-07
Am-242m	2.89E+02	-	-	-	-	-	-	10	2000	4.00E-11	4.00E-11
Am-243	3.47E+02	-	-	-	-	-	-	10	2000	4.55E-09	4.55E-09
Cm-243	1.16E+02	-	-	-	-	-	-	10	2000	2.90E-10	2.90E-10
Cm-244	6.07E+03	-	-	-	-	-	-	10	2000	3.85E-08	3.85E-08

Table 6 - Fuel Receiving and Storage (FRS) Realistic Potential Emissions

Gross Alpha	4E-07	$\mu\text{Ci/mL}$
MTU of BWR	10.50	metric tons
MTU of PWR	15.06	metric tons
Pool Volume	2.46E+09	milliliters
ARR	4.0E-07	1/hour
Volume of FRS Building	31916	m^3
Conversion CFM-M3/min	0.028317	
Total Flow over Pool	382.2795	m^3/min
Recirc. Vent. Filtered Flow	240.6945	m^3/min [1 roughing + 1 HEPA]
VEC Filtered Flow	28.317	m^3/min [1 roughing + 1 HEPA]
Unfiltered Flow	113.268	m^3/min
HEPA DF	2000	
Roughing Filter DF	10	

Radionuclide	SNF radionuclide distribution				Realistic Potential	
	Fuel		Inventory [CiL]	Pool [$\mu\text{Ci/mL}$]	Inventory [CiL]	Air
	BWR [Ci/MTU]	PWR [Ci/MTU]				Emissions [Ci/year]
H-3	—	2.08E+02	3.13E+03	—	—	—
C-14	—	—	—	—	—	—
Sr-90	2.70E+04	4.22E+04	9.19E+05	—	—	—
Y-90	2.71E+04	4.22E+04	9.20E+05	—	—	—
I-129	—	3.10E-02	4.67E-01	—	—	—
Cs-137	3.08E+04	5.94E+04	1.22E+06	2.70E-03	6.65E+00	6.91E-03
Ba-137m	2.91E+04	5.62E+04	1.15E+06	2.55E-03	6.29E+00	6.53E-03
Eu-154	5.39E+02	1.44E+03	2.73E+04	—	—	—
Pu-238	4.94E+02	1.96E+03	3.47E+04	1.33E-07	3.28E-04	3.40E-07
Pu-239	7.66E+01	3.11E+02	5.49E+03	2.10E-08	5.18E-05	5.38E-08
Pu-240	1.04E+02	5.11E+02	8.79E+03	3.37E-08	8.30E-05	8.61E-08
Pu-241	6.86E+03	3.74E+04	6.35E+05	—	—	—
Am-241	4.31E+02	2.75E+03	4.59E+04	1.76E-07	4.34E-04	4.50E-07
Am-242m	—	—	—	—	—	—
Am-243	—	1.42E+01	2.14E+02	8.19E-10	2.02E-06	2.10E-09
Cm-243	—	—	—	—	—	—
Cm-244	2.45E+01	5.99E+02	9.28E+03	3.55E-08	8.76E-05	9.09E-08

Table 7 - Slurry-Fed Ceramic Melter (SCFM) and Vit Vessel Off-Gas Realistic Potential Emissions

Realistic Potential Emissions			
Radionuclide	[Ci/year]	NRC DF	SFCM DF
H-3	—	—	—
C-14	1.80E-01	1.00E+00	1.00E+00
Sr-90	3.90E-04	4.95E+09	8.00E+00
Y-90	3.90E-04	4.95E+09	8.00E+00
I-129	3.00E-02	2.00E+00	2.00E+00
Cs-137	1.90E-02	1.09E+08	1.20E+01
Ba-137m	1.80E-02	1.09E+08	1.20E+01
Eu-154	—	—	—
Pu-238	5.30E-07	4.95E+09	2.80E+01
Pu-239	1.10E-07	4.95E+09	2.80E+01
Pu-240	8.00E-08	4.95E+09	2.80E+01
Pu-241	4.10E-06	4.95E+09	2.80E+01
Am-241	3.60E-06	4.95E+09	2.80E+01
Am-242m	1.90E-08	4.95E+09	2.80E+01
Am-243	2.30E-08	4.95E+09	2.80E+01
Cm-243	3.90E-08	1.00E+09	2.80E+01
Cm-244	2.00E-06	1.00E+09	2.80E+01

CAP-PC Synopsis and Summary Files

Main Plant Stack/Melter Off-gas

C A P 8 8 - P C
Version 1.00
Clean Air Act Assessment Package - 1988

S Y N O P S I S R E P O R T

Non-Radon Individual Assessment
May 7, 1999 3:00 pm

Facility: West Valley Demonstration Project
Address: 10282 Rock Springs Road
City: West Valley
State: NY Zip: 14171-9799

Source Category: Elevated ARP
Source Type: Stack
Emission Year: 1999

Comments: Main Stack Realistic Dose Assessment Calculation

Dataset Name: MPS Realistic
Dataset Date: May 7, 1999 2:56 pm
Wind File: WNDFILES\5YRAV60M.WND

May 7, 1999 3:00 pm

SYNOPSIS
Page 2

RADIONUCLIDE EMISSIONS DURING THE YEAR 1999

Nuclide	Class	Size	Source	TOTAL Ci/y
			#1 Ci/y	
H-3	*	0.00	8.9E+00	8.9E+00
C-14	*	0.00	2.0E+00	2.0E+00
SR-90	D	1.00	1.0E-03	1.0E-03
Y-90	Y	1.00	1.0E-03	1.0E-03
I-129	D	1.00	3.3E-02	3.3E-02
CS-137	D	1.00	2.9E-02	2.9E-02
BA-137M	D	1.00	2.7E-02	2.7E-02
EU-154	W	1.00	4.0E-04	4.0E-04
PU-238	Y	1.00	1.6E-05	1.6E-05
PU-239	Y	1.00	4.2E-06	4.2E-06
PU-240	Y	1.00	3.2E-06	3.2E-06
PU-241	Y	1.00	1.5E-04	1.5E-04
AM-241	W	1.00	1.3E-05	1.3E-05
AM-242M	W	1.00	7.3E-08	7.3E-08
AM-243	W	1.00	2.5E-07	2.5E-07
CM-243	W	1.00	6.0E-08	6.0E-08
CM-244	W	1.00	3.2E-06	3.2E-06

SITE INFORMATION

Temperature: 8 degrees C
Precipitation: 102 cm/y
Mixing Height: 1000 m

May 7, 1999 3:00 pm

SYNOPSIS
Page 3

SOURCE INFORMATION

Source Number: 1

Stack Height (m): 63.40
Diameter (m): 1.35

Plume Rise
Momentum (m/s): 1.65E+01
(Exit Velocity)

AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	0.700	0.399	0.442
Fraction From Assessment Area:	0.300	0.601	0.558
Fraction Imported:	0.000	0.000	0.000

Food Arrays were not generated for this run.
Default Values used.

DISTANCES USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

1400	1800	1900	2100	2200	2300	2400	2500	2700	3000
3100	3300								

C A P 8 8 - P C

Version 1.00

Clean Air Act Assessment Package - 1988

D O S E A N D R I S K E Q U I V A L E N T S U M M A R I E S

Non-Radon Individual Assessment
May 7, 1999 3:00 pm

Facility: West Valley Demonstration Project
Address: 10282 Rock Springs Road
City: West Valley
State: NY Zip: 14171-9799

Source Category: Elevated ARP
Source Type: Stack
Emission Year: 1999

Comments: Main Stack Realistic Dose Assessment Calculation

Dataset Name: MPS Realistic
Dataset Date: May 7, 1999 2:56 pm
Wind File: WNDFILES\5YRAV60M.WND

May 7, 1999 3:00 pm

SUMMARY
Page 5INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)
(All Radionuclides and Pathways)

Distance (m)							
Direction	1400	1800	1900	2100	2200	2300	2400
N	1.9E-01	1.8E-01	1.8E-01	1.7E-01	1.7E-01	1.7E-01	1.7E-01
NNW	2.5E-01	2.4E-01	2.4E-01	2.3E-01	2.3E-01	2.2E-01	2.2E-01
NW	1.5E-01	1.5E-01	1.4E-01	1.4E-01	1.4E-01	1.3E-01	1.3E-01
WNW	1.1E-01	1.0E-01	1.0E-01	1.0E-01	9.9E-02	9.7E-02	9.6E-02
W	1.0E-01	9.8E-02	9.7E-02	9.5E-02	9.4E-02	9.3E-02	9.1E-02
WSW	1.0E-01	9.6E-02	9.5E-02	9.3E-02	9.2E-02	9.0E-02	8.9E-02
SW	1.2E-01	1.1E-01	1.1E-01	1.0E-01	1.0E-01	1.0E-01	9.9E-02
SSW	1.2E-01	1.1E-01	1.1E-01	1.0E-01	1.0E-01	9.9E-02	9.8E-02
S	1.4E-01	1.3E-01	1.3E-01	1.2E-01	1.2E-01	1.2E-01	1.1E-01
SSE	1.8E-01	1.6E-01	1.6E-01	1.5E-01	1.5E-01	1.4E-01	1.4E-01
SE	2.7E-01	2.4E-01	2.3E-01	2.2E-01	2.1E-01	2.1E-01	2.0E-01
ESE	2.6E-01	2.4E-01	2.3E-01	2.2E-01	2.1E-01	2.1E-01	2.0E-01
E	2.2E-01	2.0E-01	2.0E-01	1.9E-01	1.8E-01	1.8E-01	1.8E-01
ENE	2.2E-01	2.0E-01	2.0E-01	1.9E-01	1.9E-01	1.8E-01	1.8E-01
NE	1.8E-01	1.7E-01	1.7E-01	1.7E-01	1.6E-01	1.6E-01	1.6E-01
NNE	1.5E-01	1.5E-01	1.4E-01	1.4E-01	1.4E-01	1.4E-01	1.3E-01
Distance (m)							
Direction	2500	2700	3000	3100	3300		
N	1.6E-01	1.6E-01	1.5E-01	1.5E-01	1.4E-01		
NNW	2.1E-01	2.0E-01	1.9E-01	1.9E-01	1.8E-01		
NW	1.3E-01	1.3E-01	1.2E-01	1.2E-01	1.1E-01		
WNW	9.5E-02	9.2E-02	8.9E-02	8.8E-02	8.6E-02		
W	9.0E-02	8.8E-02	8.5E-02	8.5E-02	8.3E-02		
WSW	8.8E-02	8.6E-02	8.3E-02	8.2E-02	8.1E-02		
SW	9.8E-02	9.5E-02	9.1E-02	9.0E-02	8.7E-02		
SSW	9.6E-02	9.3E-02	8.9E-02	8.8E-02	8.6E-02		
S	1.1E-01	1.1E-01	1.0E-01	1.0E-01	9.7E-02		
SSE	1.4E-01	1.3E-01	1.2E-01	1.2E-01	1.2E-01		
SE	2.0E-01	1.8E-01	1.7E-01	1.7E-01	1.6E-01		
ESE	1.9E-01	1.8E-01	1.7E-01	1.7E-01	1.6E-01		
E	1.7E-01	1.6E-01	1.5E-01	1.5E-01	1.4E-01		
ENE	1.7E-01	1.7E-01	1.6E-01	1.5E-01	1.5E-01		
NE	1.5E-01	1.5E-01	1.4E-01	1.4E-01	1.3E-01		
NNE	1.3E-01	1.3E-01	1.2E-01	1.2E-01	1.2E-01		

Shaded values indicate the location of the nearest residence in the designated direction



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

FEB 18 1997

Mr. T.J. Rowland
Director, West Valley Project Office
U.S. Department of Energy
10282 Rock Springs Road
P.O. Box 191, MS-DOE
West Valley, New York 14171



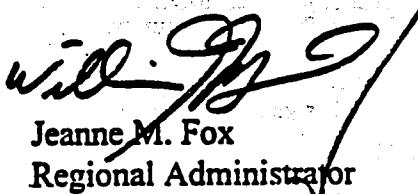
Dear Mr. Rowland:

In accordance with the provisions of the Clean Air Act, as amended (42 U.S.C. 7401 et seq.), the U.S. Environmental Protection Agency (EPA) has reviewed your applications for the Slurry Fed Ceramic Melter and the Vitrification Facility HVAC system.

Pursuant to Title 40, Code of Federal Regulations, Part 61, Subpart H, National Emission Standards for Radionuclide Emissions from Department of Energy Facilities, approval of your application is granted. This approval is granted based upon a technical review of submissions received by EPA on January 7, 1997 for the above location.

If you have any questions regarding this approval, please contact Paul A. Giardina, Radiation & Indoor Air Branch Chief, at (212) 637-4010.

Sincerely,



Jeanne M. Fox
Regional Administrator

cc: John P. Cahill, Acting Commissioner
New York State Department of
Environmental Conservation

Commissioner Barbara A. DeBuono
New York State Department of Health

45136



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY - REGION II
290 BROADWAY
NEW YORK, NEW YORK 10007-1866

MAY - 8 1995

Mr. T.J. Rowland
Director, West Valley Project Office
U.S. Department of Energy
MS-DOE
10282 Rock Springs Road
P.O. Box 191
West Valley, New York 14171

Dear Mr. Rowland:

The purpose of this letter is to discuss West Valley Demonstration Project's (WVDP) radionuclide NESHAPs air permit applications for the Slurry Fed Ceramic Melter and the Vitrification Facility HVAC System. WVDP submitted the applications to construct/modify for the two above mentioned sources pursuant to the National Emission Standards for Hazardous Air Pollutants (NESHAPs) for radionuclides, 40 CFR 61.96.

The Environmental Protection Agency (EPA) has conducted an extensive review of these applications which included an evaluation related to the source background information, review and computer modeling of the information contained within the applications, site visits and visual inspections of the two sources, and discussions with pertinent WVDP employees. Based on our review, EPA is issuing WVDP an interim approval for the operation of the Slurry Fed Ceramic Melter and the Vitrification Facility HVAC System.

Final approval for the operation of these sources will be granted assuming the following conditions are met:

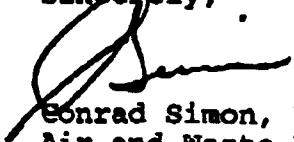
- Pursuant to 40 CFR 61.09 (1,2), WVDP must notify EPA of initial startup of these sources not more than 60 days and no less than 30 days before the startup date. Also, EPA must be notified of actual startup date within 15 days of the startup.
- Within six (6) months of the startup of these sources, WVDP must re-evaluate and re-calculate the Total Effective Dose Equivalent (TEDE) to the Maximally Exposed Off-Site Individuals (MEOSI) using real time monitoring data obtained while the vitrification facility is in operation.

- EPA inspectors will perform a visual inspection of the facility once it is in full operation.

EPA will make the determination on whether or not to grant final approval for the operation of these facilities based on the re-calculated TEDE using real time data and the inspection of the operational facility.

If there are any questions regarding this matter, please contact Paul A. Giardina of my staff at (212) 637-4010.

Sincerely,



Conrad Simon, Director
Air and Waste Management Division

cc: Paul Merges, NYDEC
John Karhnak, ORIA
Paul Giardina, AWM-RAD



Department of Energy

Idaho Operations Office
West Valley Project Office
P.O. Box 191
West Valley, NY 14171

September 29, 1993

Mr. Paul A. Giardina
Regional Radiation Representative
Region II
MS-2AWM-RAD
United States Environmental Protection Agency
26 Federal Plaza
New York, NY 10278

SUBJECT: Air Permit Applications for the Emission of Radionuclides from the
Vitrification Facility (VF) Heating, Ventilating, and Air
Conditioning (HVAC) System and Slurry Fed Ceramic Melter

Dear Mr. Giardina:

Pursuant to the National Emission Standards for Hazardous Air Pollutants,
two permit applications are enclosed for the emission of radionuclides from

1. The Vitrification Facility HVAC System, and
2. The Slurry Fed Ceramic Melter, located within the VF.

If you have any questions or comments, please contact Elizabeth Matthews of my
staff at (716) 942-4930.

Sincerely,

Bulaa A. Mazurowski
T. J. Rowland, Director
West Valley Project Office

Enclosures: 1. VF HVAC Permit Application
2. Application

cc: J. MacGruder, EPA-Region II, w/enc.
B. Varcasio, NYSDEC-Albany, w/enc.
B. Bartz, NYSDEC-Buffalo, w/o enc.
B. A. Mazurowski, WVPO, w/o enc.
L. Salvatori, WVNS, MS B1L, w/o enc.

EAM:180:93 - 1147:93:10
1149:93:10

EAM/cch

**NESHAP AIR PERMIT APPLICATION
FOR
SLURRY FED CERAMIC MELTER**

WEST VALLEY DEMONSTRATION PROJECT

Submitted by
United States Department
of Energy

September 1993



REQUEST FOR APPROVAL TO CONSTRUCT OR MODIFY
SOURCES OF ATMOSPHERIC EMISSIONS OF RADIONUCLIDES

I. NAME AND ADDRESS OF APPLICANT

U. S. Department of Energy
West Valley Demonstration Project
MS - DOE
10282 Rock Springs Road
P.O.Box 191
West Valley, New York 14171-0191

Operating Contractor:

West Valley Nuclear Services Co., Inc.
10282 Rock Springs Road
P.O.Box 191
West Valley, New York 14171-0191

II. NAME AND LOCATION OF SOURCE

Name: Off-Gas from Slurry Fed Ceramic Melter (SFCM) in Vitrification Building

Location: West Valley Demonstration Project
10282 Rock Springs Road
West Valley, New York 14171-0191

Facility Coordinates

Latitude	42 Degrees 27 Minutes N
Longitude	78 Degrees 39 Minutes W
State Plane Coordinate System (SPCS) For the Stack	
Easting	480641-9171
Northing	892769-1971
(Zone 3103 - Western New York)	
Estimated Date of Construction:	September 1993
Estimated Date of Start Up:	January 1996

III. RELEASE POINT INFORMATION

Emission Point ID:	15F-1
Ground Elevation (ft above MSL):	1,415
Stack Height (ft):	208
Height Above Structure (ft):	144
Inside Diameter (inches):	53
Exit Temperature (degrees F):	70-100
Exit Velocity (ft/sec):	60
Exit Volume (ACFM):	60,000

IV. AIR PERMIT INFORMATION

This Air Permit is being submitted for the modification to the existing EPA Air Permit # WVDP - 687-01.

V. SITE HISTORY

The West Valley Demonstration Project (WVDP) is located on 200 acres within the 3,345 acre Western New York Nuclear Services Center (Map 1) in the town of Ashford, Cattaraugus County, New York (Map 2). Nuclear Fuel Services (NFS) operated this facility to reprocess spent nuclear fuel from 1966 until 1972, after which NFS notified the New York State Energy Research and Development Authority (NYSERDA) that it would not continue in the fuel reprocessing business.

The Vitrification Facility, where the stack 15F-1 is located, is shown on Map 1. The actual location of the stack 15F-1 can be found on Drawing #900E-5290, Rev. C. Map 3 presents the prevailing wind directions, speed and percent occurrence as recorded for the year 1992. As indicated on Map 2, the surrounding terrain is relatively flat. The base elevation of the VF Facility is 1,415 feet above mean sea level. The terrain on all sides of the VF Facility, except the SW quadrant, gradually increases in elevation from approximately 1,300 feet (m.s.l.) to 1,600 feet (m.s.l.). The terrain in the SW quadrant slopes steeply to an elevation of approximately 1,700 feet (m.s.l.). A more detailed topographic description can be found in Reference 4.

The West Valley Demonstration Project Act of October 1, 1980 (Public law 96-368), authorized the Department of Energy (DOE) to perform a high-level radioactive waste management demonstration project for the purpose of demonstrating the solidification of high-level radioactive waste (HLWs) for disposal. The WVDP site contains high-level radioactive waste, which resulted from nuclear fuel reprocessing operations performed at the site prior to 1973 by NFS. The mission of the Project also includes: disposing of low-level wastes; developing containers for the high and low-level wastes; transporting the waste to a Federal repository; and decontaminating and decommissioning Project facilities.

The HLW is contained in two underground tanks, identified as 8D-2 and 8D-4. The majority of the radioactivity is contained in Tank 8D-2, where the waste has settled to form two layers: a precipitated sludge and an overlying supernatant. The supernatant is being processed to remove water and salts prior to immobilizing the sludge into a borosilicate glass matrix. The supernatant is decontaminated with a low-level waste treatment system and solidified into a cement waste form. After supernatant processing, the sludge layer will be washed to remove salts. These salts will be decontaminated using zeolite ion-exchange columns and then immobilized in cement. Once the salts have

NESHAP AIR PERMIT APPLICATION FOR OFF-GAS FROM SLURRY FED CERAMIC MELTER

TABLE OF CONTENTS

	Page
I. NAME AND ADDRESS OF APPLICANT	1
II. NAME AND LOCATION OF SOURCE	1
III. RELEASE POINT INFORMATION	1
IV. AIR PERMIT INFORMATION	2
V. SITE HISTORY	2
VI. IDENTIFICATION OF RADIONUCLIDES	3
VII. OVERVIEW OF OPERATIONS	3
VIII. OVERVIEW OF VITRIFICATION SYSTEM	4
IX. OFF-GAS SYSTEM	5
X. VITRIFICATION SCHEDULE	7
XI. SOURCE TERM DEVELOPMENT	8
XII. DOSE ASSESSMENT	8
XIII. REFERENCES	9
XIV. LIST OF DRAWINGS	10

NESHAP AIR PERMIT APPLICATION FOR OFF-GAS FROM SLURRY FED CERAMIC MELTER

TABLES, MAPS, AND FIGURES

TABLES

		<u>PAGE</u>
TABLE 1	LIST OF RADIONUCLIDES THAT CONTRIBUTE GREATER THAN 0.1% OF THE EDE	11
TABLE 2	SUMMARY OF POTENTIAL RADIOLOGICAL DISCHARGE POINTS AT THE WVDP	12
TABLE 3	ESTIMATED DISCHARGE OF RADIONUCLIDES FROM THE MAIN STACK 15F-1	14

MAPS

MAP 1	LOCATION OF BOUNDARY LINE	2-A
MAP 2	U.S.G.S. - TOPOGRAPHIC MAP	2-B
MAP 3	WIND FREQUENCY ROSE	2-C

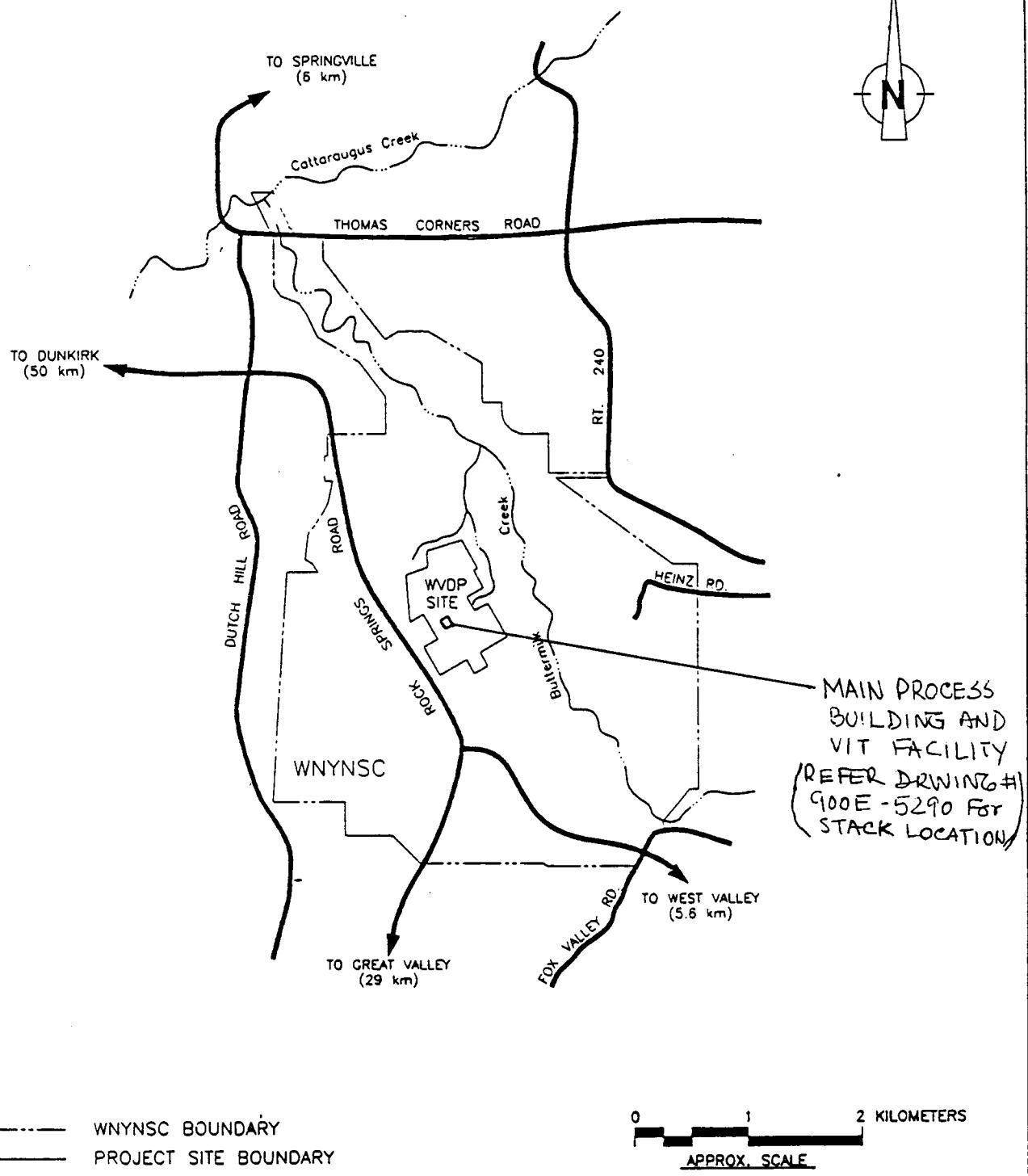
FIGURES

FIGURE 1	VITRIFICATION FACILITY AND AIR EMISSION CONTROL SYSTEM	4-A
FIGURE 2	VESSEL VENTILATION SYSTEM	5
FIGURE 3	IN-CELL OFF-GAS SYSTEM	5-B
FIGURE 4	IN-CELL ARRANGEMENT	6-A
FIGURE 5	SUBMERGED BED SCRUBBER	6-B
FIGURE 6	HIGH EFFICIENCY MIST ELIMINATOR	6-C
FIGURE 7	EX-CELL OFF-GAS SYSTEM	7-A

ATTACHMENTS

ATTACHMENT A	CLEAN AIR ACT ASSESSMENT PACKAGE - 1988 (CAP88-PC)	A-1
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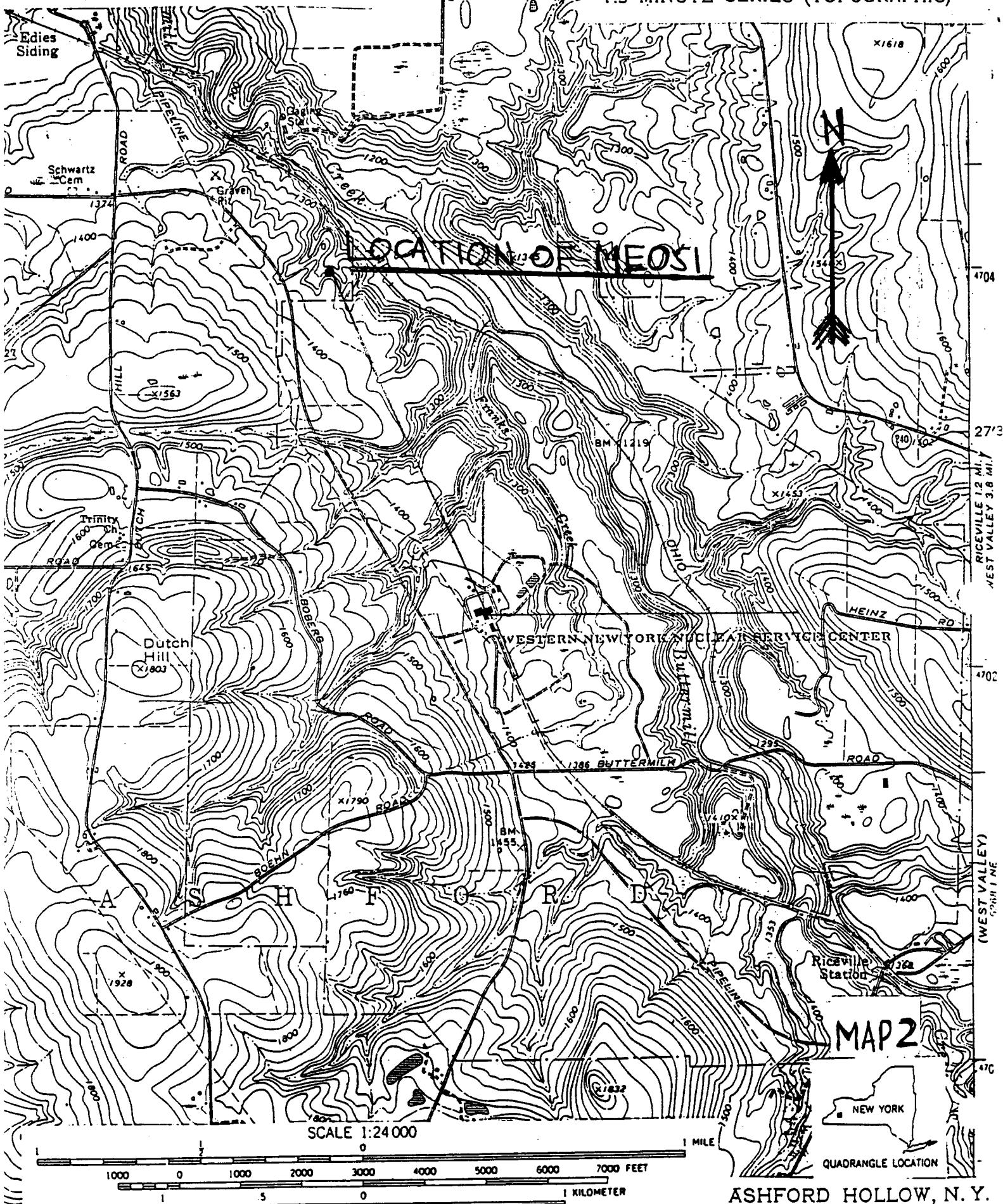
MAP 1

LOCATION OF BOUNDARY LINE

2-A

DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

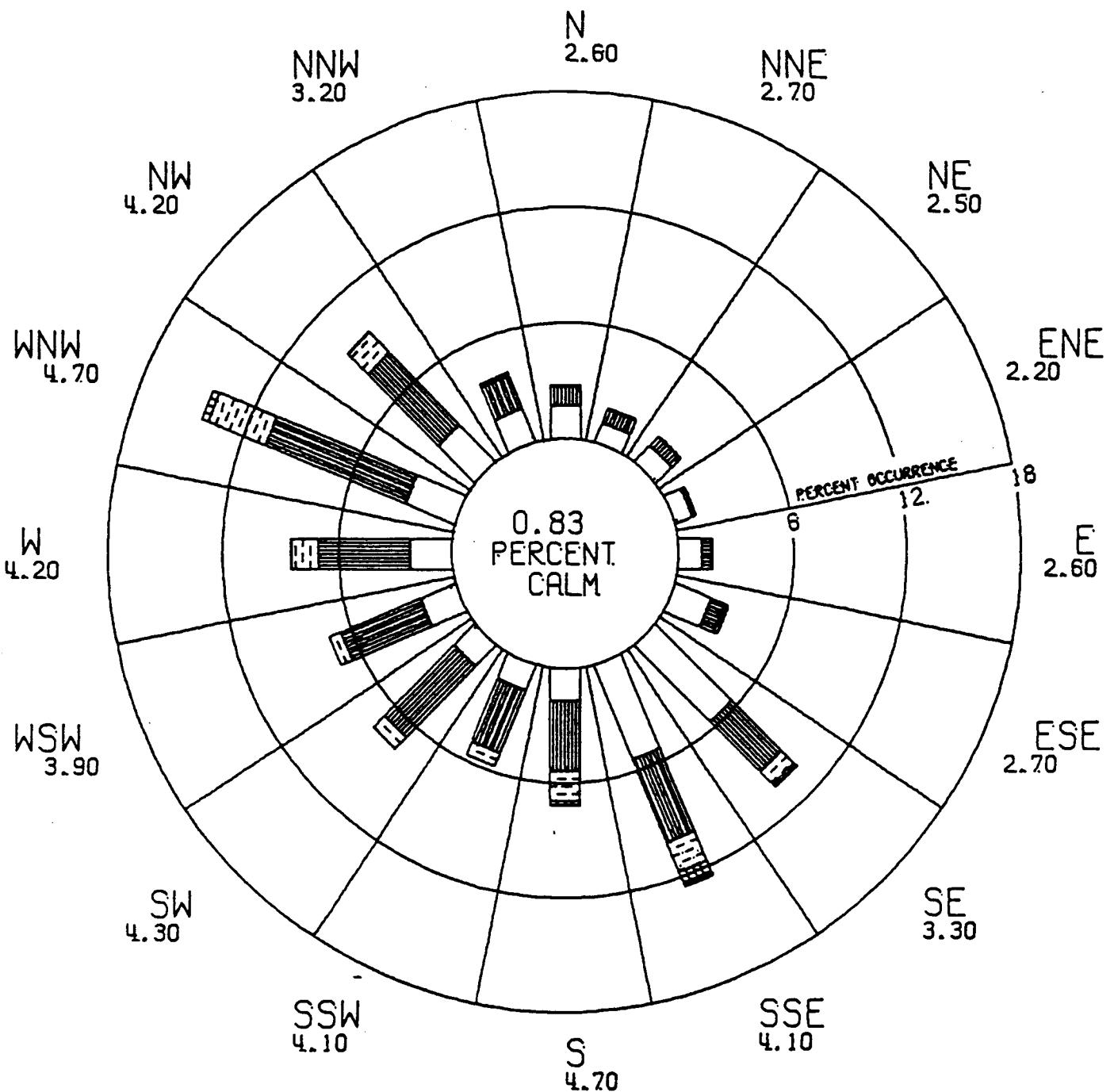
ASHFORD HOLLOW QUADRANGLE
NEW YORK.
7.5 MINUTE SERIES (TOPOGRAPHIC)



BC193:0143

CONTOUR INTERVAL 20 FEET

2-B



NUMBERS INDICATE SECTOR MEAN WIND SPEED

WIND SPEED RANGE

- 0.0- 3.0
- 3.0- 6.0
- 6.0- 9.0
- 9.0-12.0
- > 12.0

M/SEC

WEST VALLEY NUCLEAR SERVICES
PRIMARY MONITORING STATION
WEST VALLEY, NEW YORK

60.0-METER WIND FREQUENCY ROSE
JANUARY 1, 1992 - DECEMBER 31, 1992.

Figure C - 6.2

been effectively washed from the sludge, the zeolite ion-exchange media and the remaining sludge will be transferred to Tank 8D-2 and homogenized. The HLW will then be transferred to a Vitrification Facility (VF) and solidified in borosilicate glass with a Slurry-Fed Ceramic Melter (SFCM).

VI. IDENTIFICATION OF RADIONUCLIDES

Approximately 660,000 gallons of HLW was stored in the underground tanks when the Department of Energy (DOE) began the WVDP in 1982. The radionuclide content of Tank 8D-2 is listed in Table 1. Tank 8D-1 contains zeolite used in stripping off the radionuclides from the supernatant. The contents from tank 8D-1 and 8D-4 will be transferred to tank 8D-2. Tank 8D-2 will have a grinder/mixer pump to reduce the size, to mix and to homogenize the contents. The homogenized contents will be the feed to the VF Facility. Only the nuclides that constitute more than 0.1% of the total release are listed. A dispersion model was developed with this data and an CAP88-PC Computer Code (Attachment A). Other emission points and the location of these points are listed in Table 2 and Drawing 900E-5290, Rev. C.

VII. OVERVIEW OF OPERATIONS

The following sources are exhausted through the Main Plant stack 15F-1. Emissions from these sources are covered under the existing EPA Air Permit WVDP-687-01. Description of these processes and their emissions are described in details in that permit. Off-Gas exhaust from the Slurry-Fed Ceramic Melter (SFCM) will be exhausted through this stack. Description of the process and the emission sources are described in Sections VII and VIII of this application.

Analytical Chem Labs.

Radio.Chemistry Lab
Counting Room
Standard Preparation Lab
Vitrification Lab
Inductively Coupled Plasma Lab
Mass Spectrophotometry Lab

Liquid Waste Treatment System

Extraction Cell No 2 & 3
Uranium Product Cell
Uranium Loadout Room
Lower Warm Aisle
Upper Warm Aisle
Liquid Waste Cell
Extraction Chemical Room
Product Purification Cell
Chemical Operating Aisle
Lower Extraction Aisle
Upper Extraction Aisle

Fuel Receiving & Storage Bldg.

Head-End Ventilation (HEV) System

Master Slave Manipulator repair shop
General Purpose Cell
Process Mechanical Cell
Chemical Process Cell
Scrap Removal Room
Equipment Decontamination Room
Liquid Abrasive Decontamination Spray Booth.

Vessel Off-Gas (VOG) System

Waste Tank Farm off-Gas System

8D-1 High Level Waste (HLW) Tank
8D-2 HLW Tank
8D-3 HLW Tank
8D-4 HLW Tank

Low Level Waste Compactor

Temporary Ventilation System

VIII. OVERVIEW OF VITRIFICATION SYSTEM

The Vitrification System comprises components: for handling the HLW; solidifying the HLW into borosilicate glass; and treating any off-gas generated during the solidification process. These components are detailed in Figure 1. The entry and exit temperatures for all the components are also shown on this figure. The maximum temperature before the radionuclides passes through the HEPA filter #1 & 2 will be 85°C. This temperature is below 100°C. After the HEPA filter, the temperature of the exhaust gases is raised to 300°C to reduce NO_x emission.

VITRIFICATION FACILITY AND AIR EMISSION
CONTROL SYSTEM

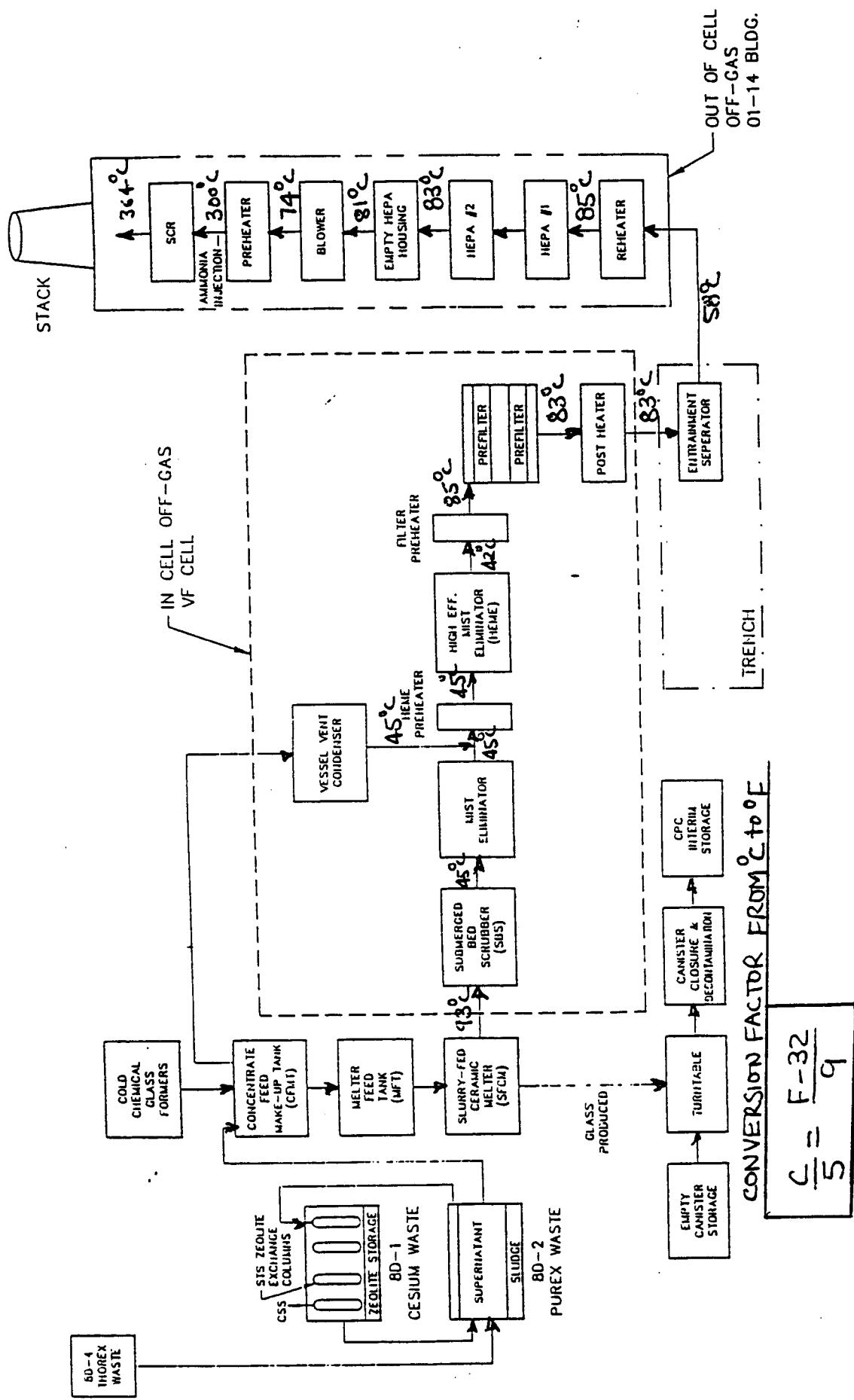


FIGURE 1

BC:93:0143

The HLW is transferred to the Concentrator Feed Make-up Tank (CFMT), where it will be mixed with process recycle streams, concentrated, and then mixed with cold chemical glass formers to form a slurry. The recycle streams are a product of canister decontamination and the Off-Gas Treatment System. The CFMT off-gas is directed into a Vessel Vent Header and Condenser to remove excess water (Figure 2). The header routes the off-gas to the In-Cell Off-Gas System (Figure 3) and the condensate to Tank 8D-3, which serves as a holding tank. The In-Cell Off-Gas System is described in a separate section.

From the CFMT, the slurry will be transferred to the Melter Feed Hold Tank (MFHT); from there it is delivered to the SFCM at a rate of up to 150 L/hr. The SFCM is the main component of the Vitrification System. It operates on many of the same principles as commercial electrical glass melters. Water is evaporated from the slurry and the remaining solids calcine and melt into a molten glass pool that will be continually mixed and homogenized. The glass is heated by passing an alternating current between three electrodes in contact with the molten glass. The glass is maintained in the melter cavity at a temperature of 1100° to 1200° C. After approximately 50 hours of mean residence time in the melter, the molten glass is transferred into receiving canisters. The glass exits the melter at up to 40 kg/hr. The filled canisters will be allowed to cool, placed in temporary storage racks in the vitrification cell, sealed, decontaminated, and transferred to a shielded cell in the former reprocessing building that serves as interim storage – until a federal repository is available for permanent storage. Figure 4 is a schematic of the Vitrification System In-Cell equipment.

IX. OFF-GAS SYSTEM

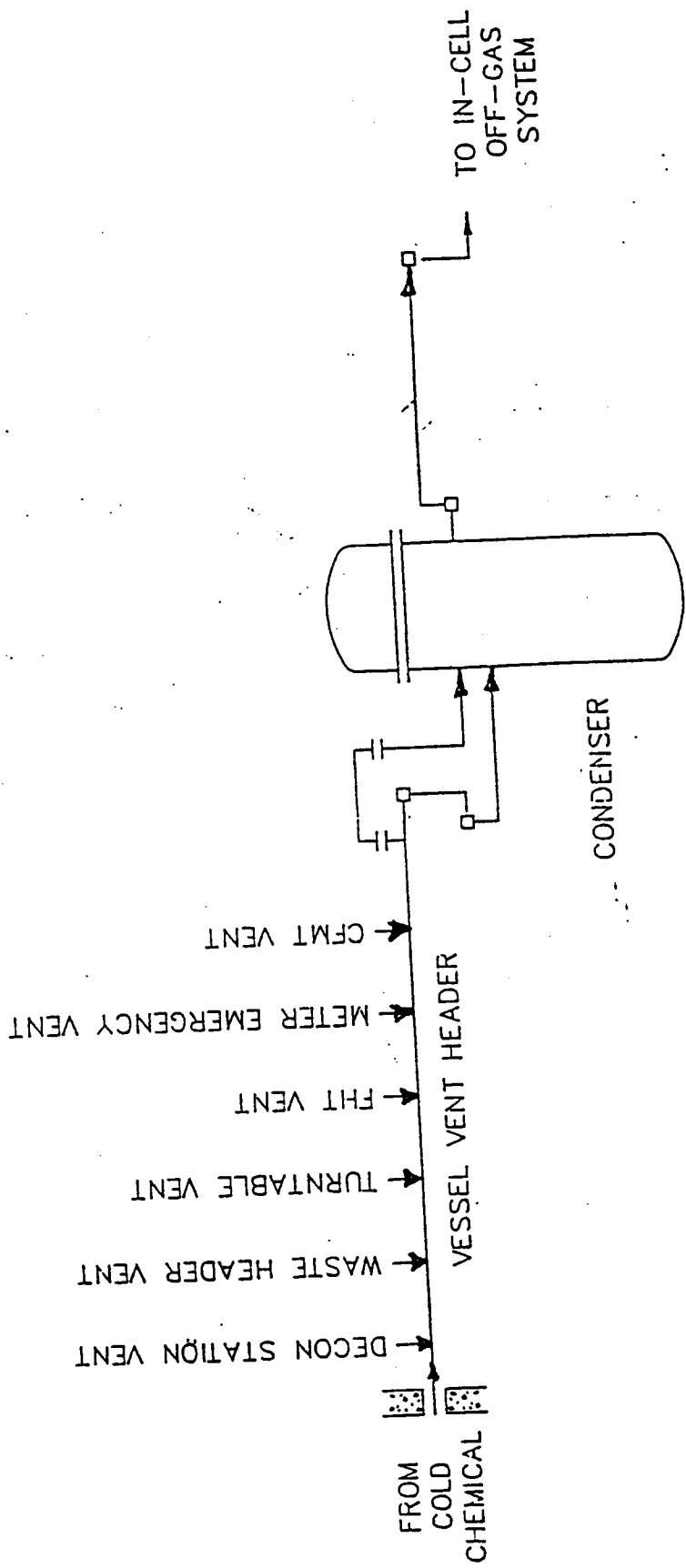
The off-gas system is designed to control the radioactive and chemical air pollutants generated from the CFMT and SFCM employed in the Vitrification Process. The Off-Gas System includes an In-Cell Off-Gas System and the Ex-Cell Off-Gas System.

Off-gases from the Slurry-Fed Ceramic Melter are treated for radionuclide removal before being exhausted through the Main Stack (15F-1).

In-Cell Off-Gas System

The Off-Gas is directed from the SFCM through a Film Cooler to the SBS. The Film Cooler is located at the beginning of the Off-Gas duct from the SFCM. It provides a boundary layer of clean air between the main stream of off-gas and the inner surface of the duct. The boundary prevents glass particles from adhering to the walls of the duct until the off-gas cools to a temperature below the glass melting point.

The In-Cell Off-Gas System maintains the SFCM at an absolute pressure lower than the cell that contains the Melter. The In-Cell Off-Gas system also provides high efficiency mist elimination, and prefiltration for the removal of radionuclides.



VESSEL VENTILATION SYSTEM	
ENVIRONMENTAL COMPLIANCE WEST VALLEY DEMONSTRATION PROJECT PREPARED BY WNS CONCEPTUAL DRAWING	RE BY: BARTKOWSKI DWG. NO. DATE: 06/06/90 060690-1 C

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Figure 2

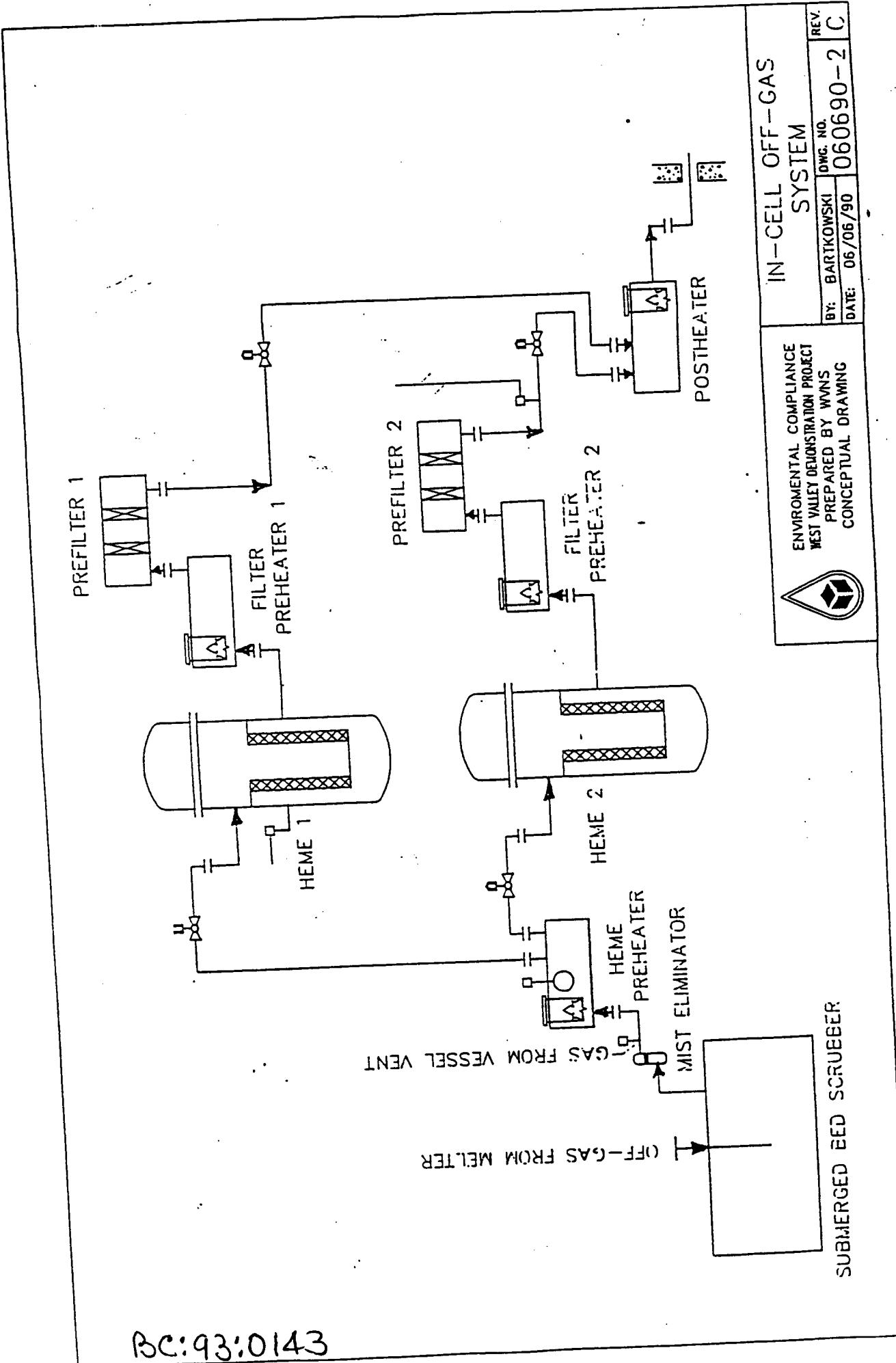


Figure 3

The In-Cell Off-Gas System (Figure 3) includes the Vessel Vent Header and Condenser; the Submerged Bed Scrubber (SBS); Mist Eliminator (ME); High Efficiency Mist Eliminator (HEME); heater; and a process prefilter that consists of two High Efficiency Particulate Air (HEPA) filter elements in series. A second HEME, heater, and prefilter unit are available to allow maintenance and change the filters (Figure 4).

The Vessel Vent Header (Figure 2) provides a mechanism to maintain the CFMT and MFHT at an absolute pressure lower than the vitrification cell for contamination control. The Header ventilates the concentrator feed hold tank, canister decontamination station, and Waste Header. The Vessel Vent Header transports vessel gas to a Condenser to remove water, which will be processed as low-level waste. The condensate is transported to Tank 8D-3 for storage. The non-condensable gases from the Vessel Vent stream flows into the In-Cell Off-Gas System upstream from the HEME Preheater (Figure 1).

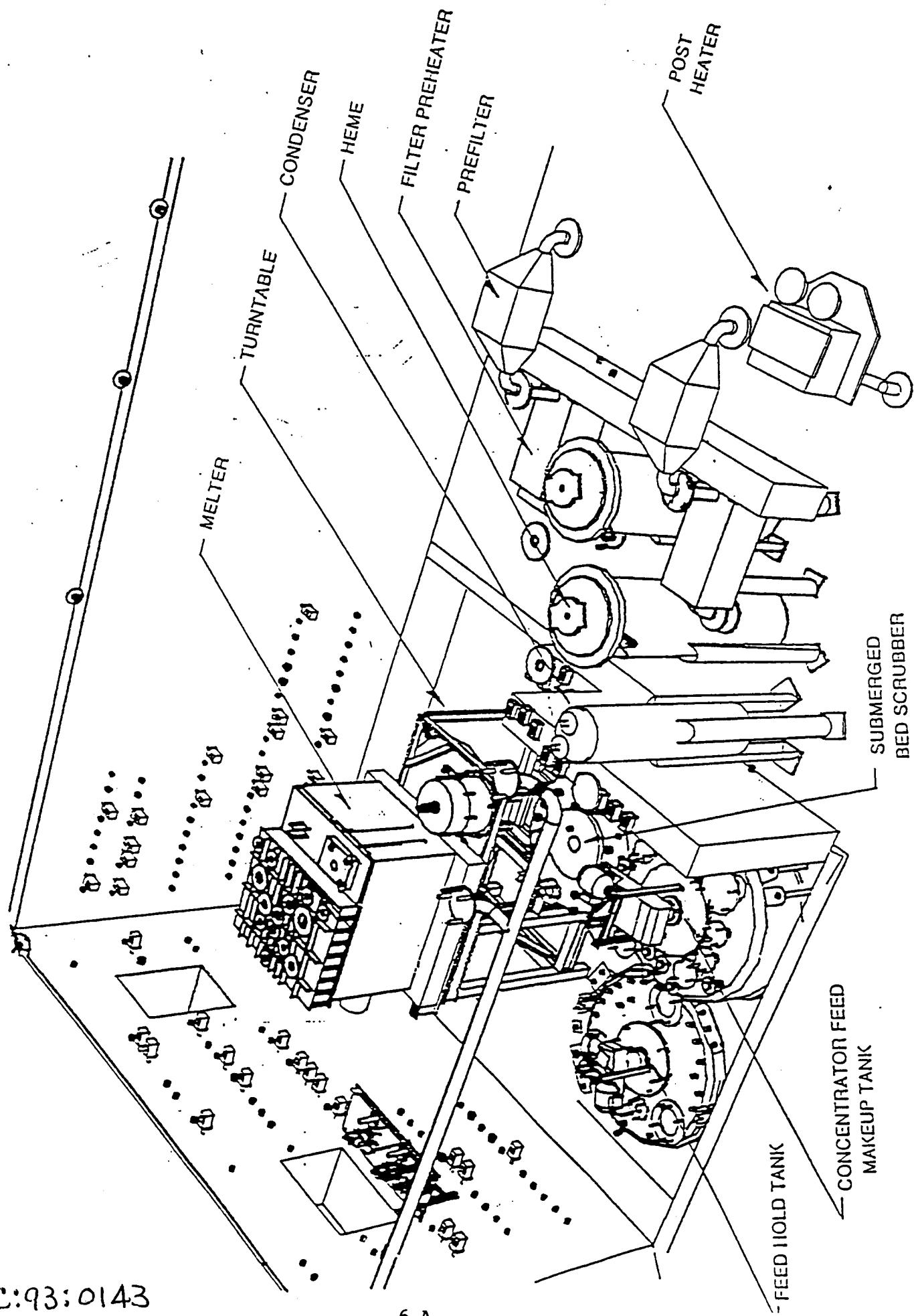
The off-gas then enters the SBS (Figure 5), where gases are drawn by a vacuum to the bottom of a submerged bed of 9-mm diameter alumina spheres. The off-gas percolates through the bed, which causes the water vapor to condense and removes particulate from the gas. Sufficient vapor/liquid contact is provided to remove the large particulate. The gas is cooled from approximately 300° to 400° C to approximately 40° C, and the large particulate and about 99 percent of the radioactivity in the off-gas is removed. In a similar fashion, the SBS also removes from 3 to 8 percent of the NO_x.

As the water vapor condenses in the SBS, the inner tank will overflow to an outer (receiver) tank where the water (condensate) and water-soluble particulate will accumulate. Insoluble particulate removed by the scrubber will accumulate as a sludge in the bottom of the inner tank and periodically will be recycled to the CFMT with the accumulated condensate.

Gas leaving the SBS enters the Mist Eliminator, which removes liquid entrained in the gas as a result of the SBS treatment. This will limit the liquid load at the HEME. The HEME (Figure 6) is a glass mesh filter device used in commercial applications, which is capable of removal efficiencies above 95% for all particulate size ranges. The HEME will be equipped with a spray wash so that the filter element can be cleaned. The collected solution from the HEME will be drained and recycled to the SBS.

The gasses will be heated and prefiltered to capture small radioactive particulate. The prefilter will contain two HEPA filter elements, each of which will remove greater than 99% of the particulate 0.3 micron or larger. Differential pressure across the prefilters will be monitored. When the differential pressure reaches the point indicating that prefilter elements are fully loaded, an alternate process filter will be remotely placed in-line with the operation. When the Vitrification Off-Gas leaves the process prefilter, it will consist primarily of air, water vapor, NO_x and a small amount of SO₂ and particulate.

IN-CELL ARRANGEMENT



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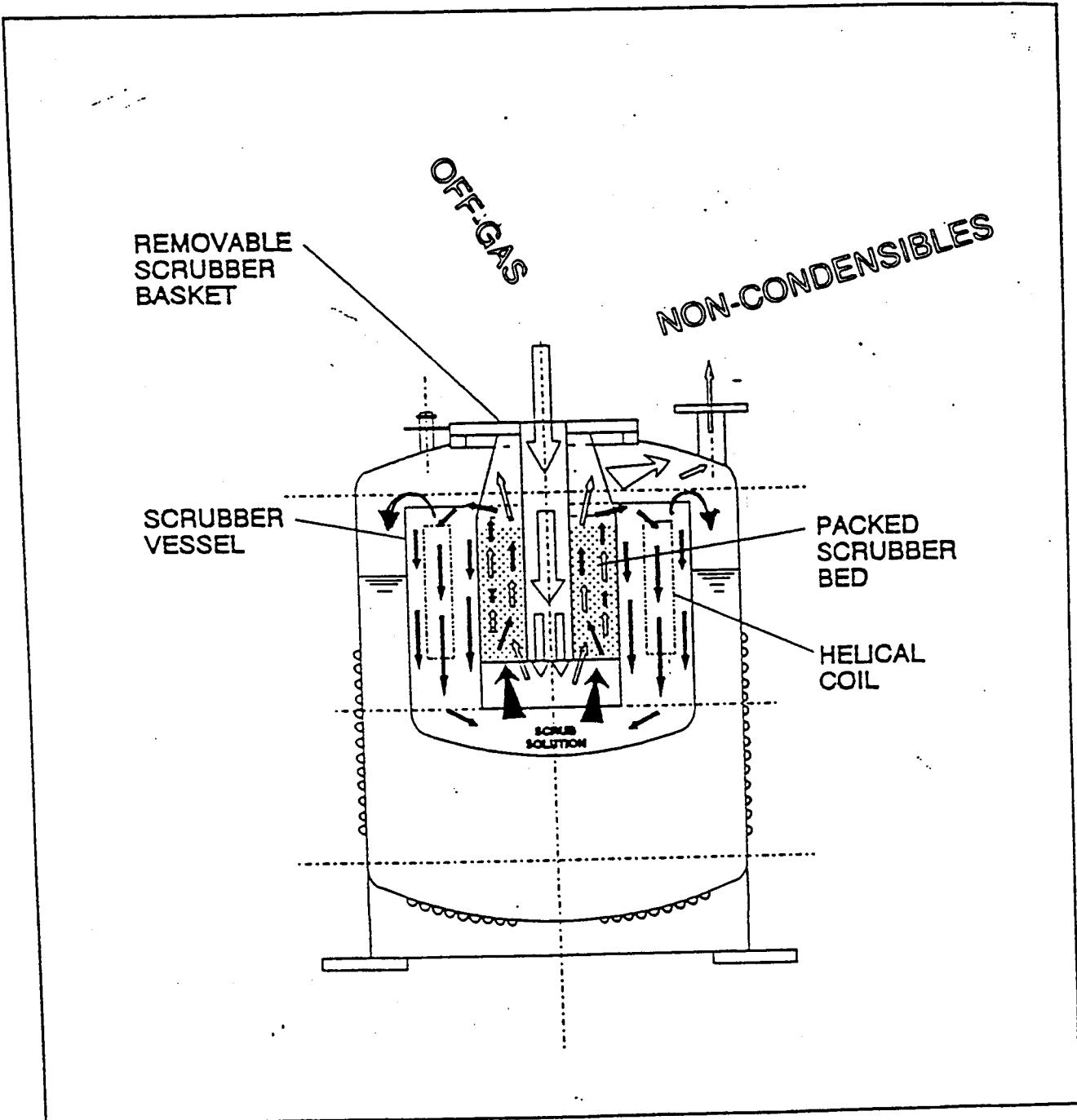


Figure 5
Submerged Bed Scrubber

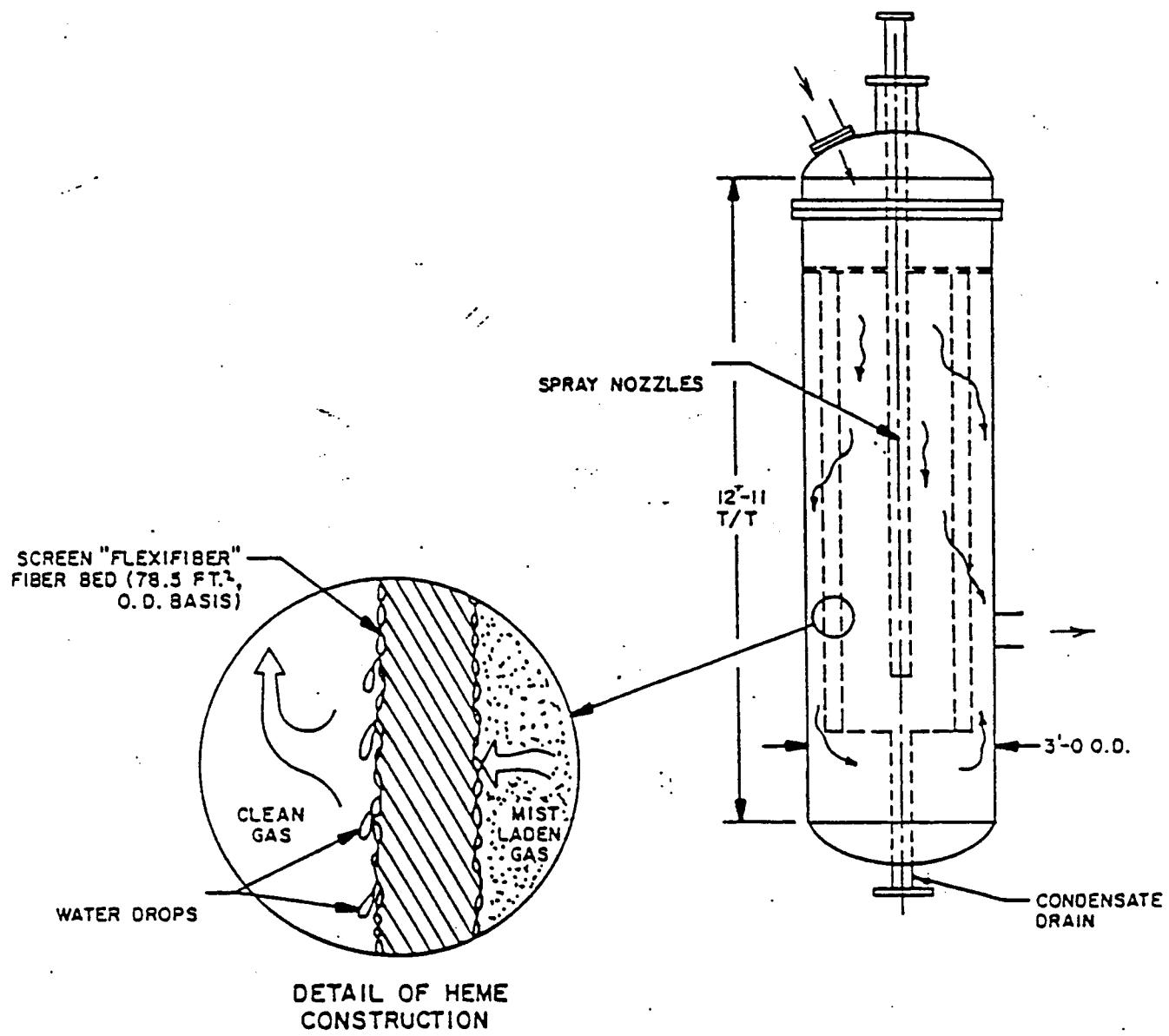


Figure 6
High Efficiency Mist Eliminator

The In-Cell off-Gas System essentially collects all the radioactive constituents. Process fluids are recycled back to the CFMT, and the gases are sent to the Ex-Cell Off-Gas System, located in the 01-14 Building, for final high efficiency filtration and NO_x removal.

Ex-Cell Off-Gas System

The Ex-Cell Off-Gas System (Figure 7) will receive off-gas from the In-Cell Off-Gas System and provide final HEPA filtration of any radioactive particulate not captured by the In-Cell System. The Ex-Cell System also will destroy NO_x gases produced by the vitrification process. The Ex-Cell processes include moisture removal, preheating, HEPA filtration, and catalytic NO_x destruction.

Off-gas from the VF will be directed to the 01-14 building through a duct in an underground tunnel. Insulation on the duct and an entrainment separator within the duct will be used to minimize or remove condensate from the off-gas. Liquid accumulated in the entrainment separator is collected, sampled, analyzed, and recycled or processed for discharge based on the results of the sample analysis.

After the entrainment separation, the gas is preheated to ensure that it enters the HEPA filters at a temperature above its dew point. The HEPA filtration removes approximately 99.997 percent of all the remaining particles. One HEPA train, which consists of two HEPA filters in series, is used while the other serves as a back up to allow maintenance or change of the filters. The integrity of the filter element to housing seals is verified by in-place dioctyl phthalate (DOP) testing. From the HEPA, NO_x and the off-gas will be transferred to a NO_x abatement system.

Following NO_x destruction, the treated off-gas will be directed to an existing main plant stack for discharge. Currently the main stack is being monitored for the emission of the radionuclides. Existing monitors at the main stack are capable of measuring the increased amount of air pollutants which will occur when the melter off-gas system comes on line in January 1996.

X. VITRIFICATION SCHEDULE

Vitrification of HLW is scheduled to begin in January 1996. Following is the tentative schedule for vitrification activities:

- | | |
|-------------------------------|----------------------------|
| • Completion of Construction | January 1995 |
| • Checkout of Process | March 95 - August 95 |
| • Cold Operation Start/Finish | September 95 - December 95 |

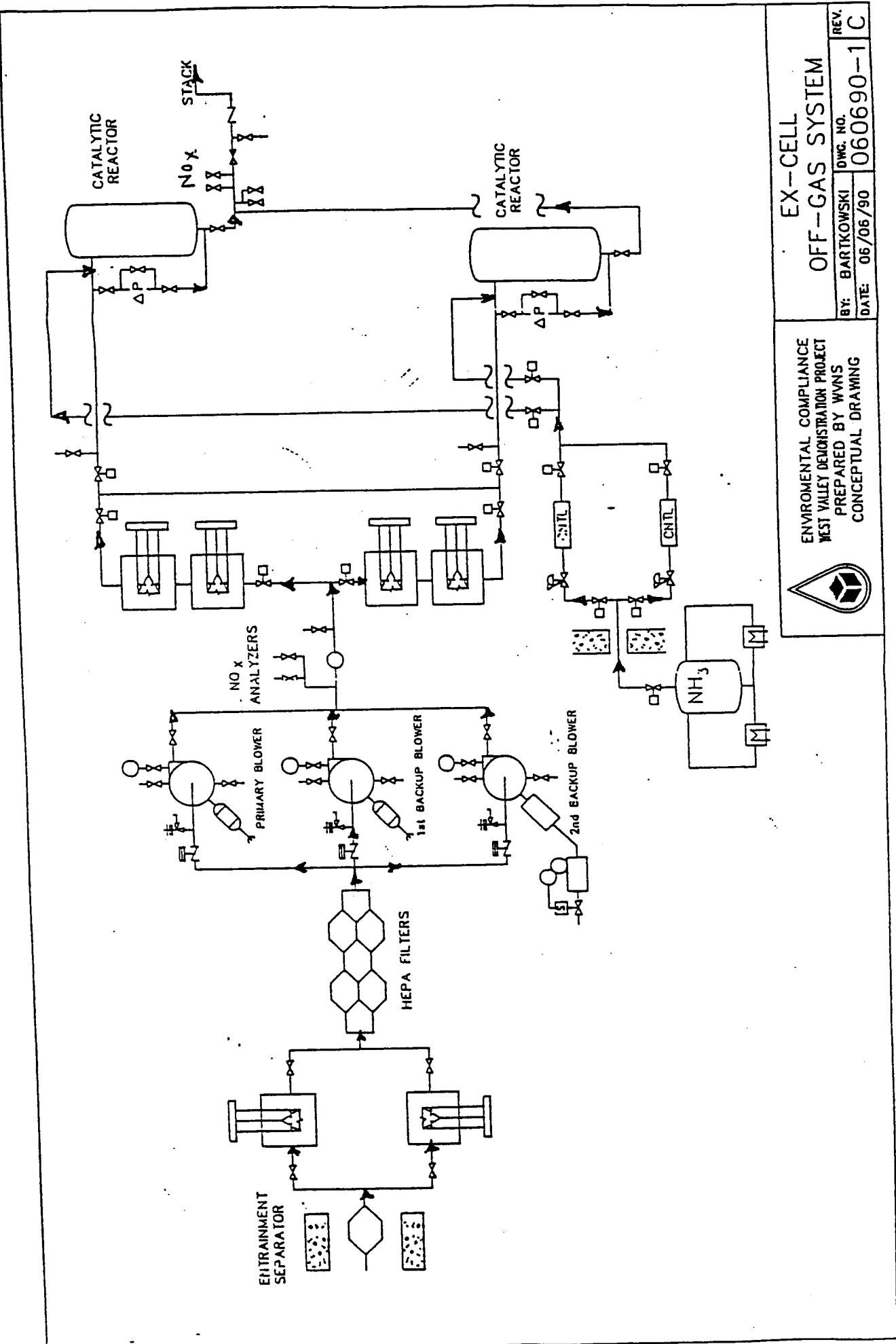


Figure 7

• Hot Operation Start/Finish

January 96 - December 99

During cold operations, glass will be produced without HLW to determine any unforeseen problems.

XI. SOURCE TERM DEVELOPMENT

Prior to the start of vitrification, the contents from Tanks 8D-1 and 8D-4 will be transferred to Tank 8D-2 and mixed to make a homogeneous waste for feed to the Vitrification Facility. A complete list of the radionuclides contained in Tanks 8D-2 and 8D-4 can be found in Reference 3. The radionuclides listed in Table 1 represent only those nuclides that contribute greater than 0.1% of the total Effective Dose Equivalent (EDE) to the Maximally Exposed Off-Site Individuals (MEOSI). Total Curies in Table 1 represents the curies in the vitrification feed during the entire campaign, which has been estimated to have a duration of approximately three years. Functional and Checkout Testing of Systems (FACTS) performed from December 1984 through December 1989 used a mini melter to simulate the vitrification process. During FACTS, element specific Decontamination Factors (DFs) were developed for the vitrification off-gas control devices (Reference 1). These element-specific DFs are also given in Table 1. The amount of radioactivity discharged from the 60-meter Main Plant Stack (15F-1) for one year of operation was estimated using Tank 8D-2 contents and applying the element specific DFs (Table 1).

XII. DOSE ASSESSMENT

The EDE to MEOSI from the vitrification emissions out of the 60-meter Main Plant Stack (15F-1) was calculated using the CAP88-PC Computer Code (Attachment A). The amount of radioactivity released from stack 15F-1 was used as input to the code. Since the discharge would be an elevated release, the modeling was performed using the 60-meter five year average meteorological data collected at the on-site primary tower. The distance from the Main Plant Stack to the location of the nearest receptor in each of the sixteen compass sectors was also used as input into the code. The results of the model run indicate that the MEOSI is located approximately 1900 meters north-northwest from the Main Plant Stack (15F-1) and will receive an estimated EDE of 2.0E-01 mrem/year from the discharge.

The Effective Dose Equivalent from the main facility is measured to be 2.9E-04 mrem/yr for 1992 (Reference 2). Table 2 lists all the sources, stack height and diameter, exit velocity, and temperature of gases. Based on the airborne radioactivity released from the site during 1992, a person living in the vicinity of the WVDP was estimated to receive a total EDE of 1.1E-04 mrem. This hypothetical maximally exposed individual was assumed to reside continuously 1900 m NNW of the site.

This dose is well below the 10 mrem NESHAPS standard promulgated by the EPA. A more conservative NESHAPS assessment was also conducted using upper detection release rates for airborne radionuclides. The resulting EDE of 2.9E-04 mrem was a factor of 2.6 higher than this analysis (Reference 2).

In the abnormal analysis performed for this application and as prescribed in the "Guidance on Implementing the Radionuclide NESHAPS" issued by the US EPA July 1991, the only abnormal circumstance identified is the pluggage of HEPA filters. If the HEPA filters are not changed in time, pressure build up might cause the filters to release radioactive contaminants to the environment in excess of the permitted amount by EPA. There are two trains of HEPA filters, one operating and the other is bypass. When the differential pressure exceeds the set point an alarm will sound indicating that the HEPA filter needs replacement. The operator then manually closes the inlet valve to the operating air stream line and opens the bypass valve to let air go through the bypass line (Draw # 906E-011 Rev 6). This operating procedure eliminates the chance of increased emission thus increased exposure to the off-site individuals.

Possible abnormal circumstances that can be reasonably foreseen as a result of the operation of the equipment involved will be covered in a Safety Analysis Report (SAR) currently under preparation. A copy of this report can be provided when completed.

XIII. REFERENCE

- 1) "West Valley Demonstration Project Vitrification Process Equipment Functional and Checkout Testing of Systems (FACTS)," September 30, 1990, DOE/NE/44139-64.
- 2) West Valley Demonstration Project Site Environmental Report - 1992.
- 3) Letter EK:89:0232, R. L. Crocker to Distribution, "Vitrification Mass Balance Spreadsheet, Revision Number 7," Dated October 10, 1989.
- 4) WVNS - SAR 001 "Project overview and general information - Chapter 3", dated June 11, 1993.

XIV. LIST OF DRAWINGS

900E-705 Abbreviations and Legend P & ID, Sheet 1
900E-705 CTS Concentrator Feed Make-Up Tank 63-V-001 P & ID, Sheet 2
900E-705 Melter Feed Hold Tank 63-V-011 P & ID, Sheet 3
900E-705 Primary Scrubber Scrub Section, Sheet 14 & 15
900E-705 Melter Off-Gas System, Pre-Heater And HEME P & ID, Sheet 21
900E-705 Vessel Off-Gas, Filters and Heaters P & ID, Sheet 22
900E-705 Ex-Cell Vent Header P & ID, Sheet 25
900E-4296 Index Vitrification & 01-14, Sheet 1
900E-705 CTS Vessel Vent System, Sheet 19
900E-705 Turn Table, Sheet 12
900E-705 Canister Decontamination Tank 63-V-044, Sheet 23
900E-705 Canister Welding Station 63-V-049, Sheet 24
15R-A-74 P & ID - Controlled Ventilation System Below Grade to El 131'
15R-A-75 P & ID - Controlled Ventilation System Above El 131'
900E-5290 WVDP Site Map - Radiological Emission Source Points
Rev. C (Information Copy)
906E-011 Vit Facility P&ID Melter Ex-cell Off-gas system
Rev. 6

TABLE 1

LIST OF RADIONUCLIDES THAT CONTRIBUTE GREATER THAN 0.1% OF THE EDE

JUNE 1993

NUCLIDES	TOT. CURIES	CURIOS/YR	DF PER NRC	DISCHARGE Ci/Year
C-14	5.49E-01	1.83E-01	1.00E+00	1.83E-01
Sr-90	5.81E+06	1.94E+06	4.95E+09	3.91E-04
Tc-99	1.09E+02	3.63E+01	1.00E+04	3.63E-03
I-129	1.81E-01	6.02E-02	2.00E+00	3.01E-02
Cs-137	6.28E+06	2.09E+06	1.09E+08	1.92E-02
Ac-227	9.43E+00	3.14E+00	1.00E+09	3.14E-09
Pu-238	7.92E+03	2.64E+03	4.95E+09	5.33E-07
Pu-239	1.63E+03	5.42E+02	4.95E+09	1.09E-07
Pu-240	1.19E+03	3.98E+02	4.95E+09	8.04E-08
Pu-241	6.04E+04	2.01E+04	4.95E+09	4.07E-06
Am-241	5.36E+04	1.79E+04	4.95E+09	3.61E-06
Am-242m	2.89E+02	9.63E+01	4.95E+09	1.94E-08
Am-243	3.47E+02	1.16E+02	4.95E+09	2.33E-08
Cm-243	1.16E+02	3.86E+01	1.00E+09	3.86E-08
Cm-244	6.07E+03	2.02E+03	1.00E+09	2.02E-06

*NOTE - Radionuclides content of Tank 8D-2

TABLE 2

SUMMARY OF POTENTIAL RADIOLOGICAL DISCHARGE POINTS AT THE WVDP

JUNE 1993						
E.P	DESCRIPTION	PERMIT #	EDE/YR & MONITOR.	STACK HT/DIA (Ft/In)	STACK EXT.VEL/TEMP (F/S/°F)	STACK
01*	Main Process Bldg Ventilation.	WVDP-687-01	> 0.1 mrem. stack monitoring done	208/54	60/100	
02	Portable Ventil. Unit	WVDP-587-01	< 0.0001 mrem. No monitoring done	Var/5-10	30-61.2/70	
03	Low-Level Waste Comp.	WVDP-487-01	< 0.01 mrem. No monitoring done.	18/9.5	27/70	
04	Supernatant Treatment System Ventilation.	WVDP-387-01	> 0.10 mrem. Monitoring done.	33/18.5	35-66/100	
05	Contact Size Reduction	WVDP-287-01	0.12 mrem. Monitoring done.	195/21	42/100	
06	Cement System Ventilation	WVDP-107-01	4.3 mrem. Monitoring done.	73/23.6	50/100	
07	Low-Level Waste Treatment Facility	No Permit EDE < 0.1 mrem	0.005 mrem. No monitoring	10/18	40/70	
08	Laundry	No Permit EDE < 0.1 mrem	0.0009 mrem. Periodic conf. measurement.	10/12	75/75	
09	Low Level Storage	No Permit	0.005 mrem	-----	-----	

TABLE 2 (Continued)

E.P	DESCRIPTION	PERMIT #	EDE/Yr & MONITOR.	STACK HT/DIA (Ft/In)	STACK EXT. VEL/TEMP (F/S/°F)
	Building	EDE < 0.1 mrem	No monitoring.	-----	-----
10	Drum Cell	No Permit EDE < 0.01 mrem	<0.01 mrem No monitoring.	-----	-----
11	CPC Storage Bldg.	No permit EDE < 0.1 mrem	0.08 mrem No monitoring.	-----	-----
12	NDA Interc. Trench Pretreatment System	No Permit EDE < 0.1 mrem	0.0008 mrem No monitoring.	-----	-----
13	Environmental Lab	No Permit	0.00005 mrem	-----	-----
	Ventilation	EDE < 0.1 mrem	No monitoring.	-----	-----
14	Vit Facility HVAC System	New Permit Applied.	0.00095 mrem.	75/36	55.6/90
15*	Slurry-Fed Ceramic Melter Off-Gas System	New Permit (mod) Applied.	0.20 mrem.	208/54	60/100
*		Emission Point 15 is same as Emission Point 01. This new permit will be a modification to the existing permit WVDP-687-01.			

TABLE 3

ESTIMATED DISCHARGE OF RADIONUCLIDES FROM THE MAIN STACK 15F-1

ASSUMPTION: MEASURED RELEASE FROM THE STACK 15F-1 IN 1992 WILL REMAIN MORE OR LESS SAME IN YEAR 1996.

RADIONUCLIDE	MEASURED RELEASE RATE IN 1992	ESTIMATED RELEASE RATE FROM OFF-GAS MELTER SYSTEM 1996 - 1999	TOTAL ESTIMATED RELEASE RATE 1996 - 1999
C-14	*	1.83E-01	1.83E-01
Sr-90	5.11E-06	3.91E-04	3.96E-04
Tc-99	*	3.6E-03	3.6E-03
I-129	6.94E-06	3.01E-02	3.012E-02
Cs-137	1.9E-05	1.92E-02	1.922E-02
Cs-134	< 8.89E-08	*	< 8.89E-08
Co-60	< 8.92E-08	*	< 8.92E-08
Ac-227	*	3.14E-09	3.14E-09
Eu-154	< 2.51E-07	*	< 2.51E-07
U-232	< 3.14E-08	*	< 3.14E-08
U-233/234	< 2.46E-08	*	< 2.46E-08
U-235	< 1.88E-08	*	< 1.88E-08
U-236	< 2.02E-08	*	< 2.02E-08
U-238	< 1.96E-08	*	< 1.96E-08
Pu-238	< 4.11E-08	5.33E-07	5.74E-07
Pu-239	6E-08	1.09E-07	1.69E-07
Pu-240	6E-08	8.04E-08	1.404E-07
Pu-241	*	4.07E-06	4.07E-06
Am-241	2.08E-07	3.61E-06	3.82E-06
Am-242m	*	1.94E-08	1.94E-08
Am-243	*	2.33E-08	2.33E-08
Cm-243	*	3.86E-08	3.86E-08
Cm-244	*	2.02E-08	2.02E-08

ATTACHMENT A

BC:93:0143



Attachment A

C A P 8 8 - P C

Version 1.00

Clean Air Act Assessment Package - 1988

D O S E A N D R I S K E Q U I V A L E N T S U M M A R I E S

Non-Radon Individual Assessment
Apr 14, 1993 2:28 pm

Facility: West Valley Demonstration Project
Address: P. O. Box 191
Rock Springs Road
City: West Valley
State: NY Zip: 14171-0191

Source Category: Vitrification Facility (SFCM) Off-Gas
Source Type: Stack
Emission Year: 1996

Comments: Emission Point: Main Plant Stack (60 meters)

Dataset Name: SFCM Permit Appl
Dataset Date: Apr 14, 1993 2:28 pm
Wind File: WNDFILES\5YRAV60M.WND

BC:93;0143

Apr 14, 1993 2:28 pm

SYNTHETIC
Page 2

RADIONUCLIDE EMISSIONS DURING THE YEAR 1996

Nuclide	Class	Size	Source	TOTAL Ci/y
			#1 Ci/y	
C-14	*	0.00	1.8E-01	1.8E-01
SR-90	D	1.00	3.9E-04	3.9E-04
Y-90	Y	1.00	3.9E-04	3.9E-04
I-129	D	1.00	3.0E-02	3.0E-02
CS-137	D	1.00	1.9E-02	1.9E-02
BA-137M	D	1.00	1.9E-02	1.9E-02
AM-241	W	1.00	3.6E-06	3.6E-06
AC-227	Y	1.00	3.1E-09	3.1E-09
PU-238	Y	1.00	5.3E-07	5.3E-07
PU-239	Y	1.00	1.1E-07	1.1E-07
PU-240	Y	1.00	8.0E-08	8.0E-08
PU-241	Y	1.00	4.1E-06	4.1E-06
AM-242M	W	1.00	1.9E-08	1.9E-08
AM-243	W	1.00	2.3E-08	2.3E-08
CM-243	W	1.00	3.9E-08	3.9E-08
CM-244	W	1.00	2.0E-06	2.0E-06
TC-99	W	1.00	3.6E-03	3.6E-03

SITE INFORMATION

Temperature: 10 degrees C
Precipitation: 100 cm/y
Mixing Height: 1000 m

BC:93:0143

A-2

Apr 14, 1993 2:28 pm

SYNOPSIS
Page 1

SOURCE INFORMATION

Source Number: 1

Stack Height (m): 63.40
Diameter (m): 1.35

Plume Rise
Momentum (m/s): 1.83E+01
(Exit Velocity)

AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	0.700	0.399	0.442
Fraction From Assessment Area:	0.300	0.601	0.558
Fraction Imported:	0.000	0.000	0.000

Food Arrays were not generated for this run.
Default Values used.

DISTANCES USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

1300	1400	1800	1900	2100	2300	2400	2500	2600	2700
2900	3400								

BC:93:0143

Apr 14, 1993 2:28 pm

SUMMARY

INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)
(All Radionuclides and Pathways)

Direction	Distance (m)						
	1300	1400	1800	1900	2100	2300	2400
N	1.6E-01	1.6E-01	1.6E-01	1.6E-01	1.5E-01	1.5E-01	1.4E-01
NNW	2.2E-01	2.2E-01	2.1E-01	2.0E-01*	2.0E-01	1.9E-01	1.9E-01
NW	1.3E-01	1.3E-01	1.3E-01	1.3E-01	1.2E-01	1.2E-01	1.2E-01
WNW	9.7E-02	9.6E-02	9.2E-02	9.1E-02	8.8E-02	8.6E-02	8.5E-02
W	9.1E-02	9.0E-02	8.7E-02	8.6E-02	8.4E-02	8.2E-02	8.1E-02
WSW	9.0E-02	8.9E-02	8.5E-02	8.4E-02	8.3E-02	8.1E-02	8.0E-02
SW	1.0E-01	1.0E-01	9.7E-02	9.5E-02	9.2E-02	8.9E-02	8.8E-02
SSW	1.0E-01	1.0E-01	9.5E-02	9.4E-02	9.1E-02	8.8E-02	8.7E-02
S	1.3E-01	1.2E-01	1.1E-01	1.1E-01	1.1E-01	1.0E-01	1.0E-01
SSE	1.6E-01	1.6E-01	1.4E-01	1.4E-01	1.3E-01	1.3E-01	1.2E-01
SE	2.4E-01	2.4E-01	2.1E-01	2.0E-01	1.9E-01	1.8E-01	1.8E-01
ESE	2.3E-01	2.2E-01	2.0E-01	2.0E-01	1.9E-01	1.8E-01	1.7E-01
E	1.9E-01	1.9E-01	1.8E-01	1.7E-01	1.6E-01	1.6E-01	1.5E-01
ENE	1.9E-01	1.9E-01	1.8E-01	1.7E-01	1.7E-01	1.6E-01	1.6E-01
NE	1.6E-01	1.6E-01	1.5E-01	1.5E-01	1.5E-01	1.4E-01	1.4E-01
NNE	1.3E-01	1.3E-01	1.3E-01	1.3E-01	1.2E-01	1.2E-01	1.2E-01

Direction	Distance (m)				
	2500	2600	2700	2900	3400
N	1.4E-01	1.4E-01	1.4E-01	1.3E-01	1.2E-01
NNW	1.8E-01	1.8E-01	1.8E-01	1.7E-01	1.5E-01
NW	1.1E-01	1.1E-01	1.1E-01	1.1E-01	9.8E-02
WNW	8.4E-02	8.3E-02	8.2E-02	8.0E-02	7.6E-02
W	8.0E-02	8.0E-02	7.9E-02	7.7E-02	7.3E-02
WSW	7.9E-02	7.8E-02	7.7E-02	7.5E-02	7.2E-02
SW	8.7E-02	8.5E-02	8.4E-02	8.2E-02	7.7E-02
SSW	8.5E-02	8.4E-02	8.3E-02	8.1E-02	7.6E-02
S	9.9E-02	9.7E-02	9.5E-02	9.2E-02	8.6E-02
SSE	1.2E-01	1.2E-01	1.2E-01	1.1E-01	1.0E-01
SE	1.7E-01	1.7E-01	1.6E-01	1.5E-01	1.4E-01
ESE	1.7E-01	1.7E-01	1.6E-01	1.5E-01	1.4E-01
E	1.5E-01	1.5E-01	1.4E-01	1.4E-01	1.2E-01
ENE	1.5E-01	1.5E-01	1.5E-01	1.4E-01	1.3E-01
NE	1.4E-01	1.3E-01	1.3E-01	1.3E-01	1.2E-01
NNE	1.2E-01	1.1E-01	1.1E-01	1.1E-01	1.0E-01

Shaded values indicate the location of the nearest residence in each sector.
* Location of maximally exposed off-site individual.

BC:93:0143